F6 Series, 2-Way, HDU Butterfly Valve
Resilient Seat, 304 Stainless Disc

- **50 psi bubble tight shut-off**
- **Long stem design allows for 2" insulation**
- **Valve face-to-face dimensions comply with API 609 & MSS-SP-67**
- **Completely assembled and tested, ready for installation**

Application

These valves are designed to meet the needs of HVAC and commercial applications requiring bubble tight shut-off for liquids. Typical applications include chiller isolation, cooling tower isolation, change-over systems, large air handler coil control, bypass and process control applications. The large C_v values provide for an economical control valve solution for larger flow applications. Designed for use in Victaulic piping systems when mated to Victaulic 41 series flange nipples.

Jobsite Note

Valves should be stored in a weather protected area prior to construction. Complete installation recommendations can be found in Belimo's Installation and Maintenance Instructions for F6…HDU Butterfly Valves.

Technical Data	
Service	chilled, hot water, 60% glycol
Flow characteristic	modified equal percentage
Controllable flow range	82°
Sizes	2" to 12"
Type of end fitting	for use with ANSI Class 125/150 flanges
Materials	
Body	ductile iron ASTM A536
Body finish	epoxy powder coated
Disc	304 stainless steel
Seat	EPDM
Shaft	416 stainless steel
O-ring	EPDM
Bushings	RPTFE
Media temperature range	-22°F to 250°F [-30°C to 120°C]
Body pressure rating	ASME/ANSI Class 125
Close-off pressure	50 psi
Rangeability	10:1 (for 30° to 70° range)
Maximum velocity	12 FPS
Leakage	bubble tight

		Valve Nominal Size		Type	Suitable Actuators					
C_v 90°	C_v 60°	IN	DN [mm]	2-way	Spring	Non-Spring				Electronic Fail-Safe
115	44	2"	50	F650HDU	AF Series	AM Series			SY Series	
196	75	2½"	65	F665HDU						
302	116	3"	80	F680HDU						
600	230	4"	100	F6100HDU			GM Series			GK Series
1022	392	5"	125	F6125HDU				DR		
1579	605	6"	150	F6150HDU						DKR
3136	1202	8"	200	F6200HDU						
5340	2047	10"	250	F6250HDU						
8250	3062	12"	300	F6300HDU						

			MOD								ON/OFF
Valve	Size	C_v	10°	20°	30°	40°	50°	60°	70°	80°	90°
F650HDU	2"	115	.06	3	7	15	27	44	70	105	115
F665HDU	2½"	196	.10	6	12	25	45	75	119	178	196
F680HDU	3"	302	.20	9	18	39	70	116	183	275	302
F6100HDU	4"	600	.30	17	36	78	139	230	364	546	600
F6125HDU	5"	1022	.50	29	61	133	237	392	620	930	1022
F6150HDU	6"	1579	.80	45	95	205	366	605	958	1437	1579
F6200HDU	8"	3136	2	89	188	408	727	1202	1903	2854	3136
F6250HDU	10"	5340	3	151	320	694	1237	2047	3240	4859	5340
F6300HDU	12"	8250	4	234	495	1072	1911	3062	5005	7507	8250

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F6 Series, 2-Way, HDU Butterfly Valve
Resilient Seat, 304 Stainless Disc

Maximum Dimensions (Inches)

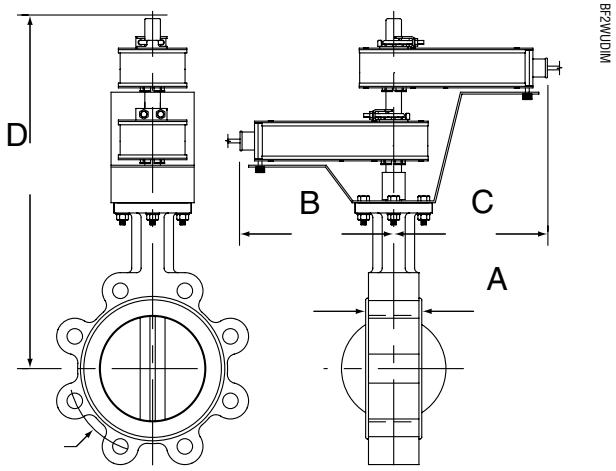
Valve	Size	C_v 90°	C_v 60°	A	B	C	D(Max)	BHC	No. of Holes	Lug Bolt	Actuator	Close-Off (PSI)	
F650HDU	2”	115	44	1.65	9.00	9.00	19.50	4.75	4	5/8-11 UNC	AF	50	Spring Return
F665HDU	2½”	196	75	1.81	9.00	9.00	20.00	5.50	4	5/8-11 UNC		50	
F680HDU	3”	302	116	1.81	9.00	9.00	20.50	6.00	4	5/8-11 UNC		50	
F6100HDU	4”	600	230	2.05	9.00	9.00	21.00	7.50	8	5/8-11 UNC	2*AF	50	
F6125HDU	5”	1022	392	2.19	9.00	9.00	22.00	8.50	8	3/4-10 UNC		50	
F6100HDU	4”	600	230	2.05	8.00	8.00	17.00	7.50	8	5/8-11 UNC	GK	50	Electronic Fail-Safe
F6125HDU	5”	1022	392	2.19	8.00	8.00	17.50	8.50	8	3/4-10 UNC		50	
F6150HDU	6”	1579	605	2.19	8.00	8.00	22.50	9.50	8	3/4-10 UNC	2*GK	50	
F650HDU	2”	115	44	1.65	7.00	7.00	15.00	4.75	4	5/8-11 UNC	AM	50	Non-Spring Return
F665HDU	2½”	196	75	1.81	7.00	7.00	15.50	5.50	4	5/8-11 UNC		50	
F680HDU	3”	302	116	1.81	7.00	7.00	16.00	6.00	4	5/8-11 UNC		50	
F6100HDU	4”	600	230	2.05	8.00	8.00	17.00	7.50	8	5/8-11 UNC	GM	50	
F6125HDU	5”	1022	392	2.19	8.00	8.00	17.50	8.50	8	3/4-10 UNC		50	
F6150HDU	6”	1579	605	2.19	8.00	8.00	22.50	9.50	8	3/4-10 UNC	2*GM/GK	50	
F6150HDU	6”	1579	605	2.19	6.00	4.00	18.00	9.50	8	3/4-10 UNC	DR/DKR	50	
F650HDU	2”	115	44	1.65	4.25	4.25	15.50	4.75	4	5/8-11 UNC	SY1…	50	
F665HDU	2½”	196	75	1.76	4.25	4.25	16.00	5.50	4	5/8-11 UNC		50	
F680HDU	3”	302	116	1.78	4.25	4.25	16.25	6.00	4	5/8-11 UNC		50	
F6100HDU	4”	600	230	2.05	8.00	13.00	22.00	7.50	8	5/8-11 UNC	SY2…	50	
F6125HDU	5”	1022	392	2.19	8.00	13.00	22.50	8.50	8	3/4-10 UNC		50	
F6150HDU	6”	1579	605	2.19	8.00	13.00	23.00	9.50	8	3/4-10 UNC		50	
F6200HDU	8”	3136	1202	2.37	8.00	13.00	24.25	11.75	8	3/4-10 UNC	SY3…	50	
F6250HDU	10”	5340	2047	2.67	8.00	13.00	25.50	14.25	12	7/8-9 UNC		50	
F6300HDU	12”	8250	3062	3.01	8.00	13.00	27.25	17.00	12	7/8-9 UNC	SY4…	50	

Dimension “A” is compressed, add .125” for relaxed state.
AF, AM and GM maximum actuator ambient temperature is 122°F.
SY maximum actuator ambient temperature is 150°F.
Model SY1… does not have handwheel - override is via 8mm wrench on bottom side of actuator.

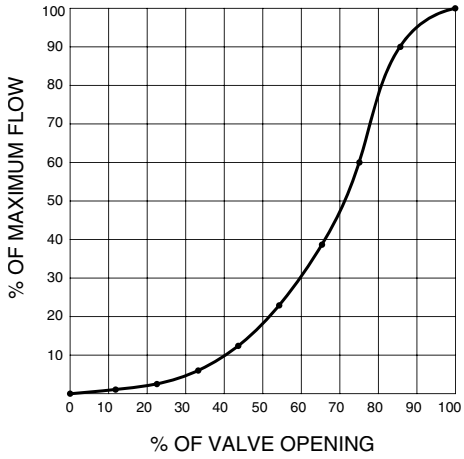
Application Notes

1. Valves are rated at 50 psi differential pressure in the closed position.
2. Valves are furnished with lugs tapped for use with ANSI Class 125/150 flanges. Installation flanges and hardware are not included.
3. 2-way assemblies are furnished assembled and tested, ready for installation.
4. Dimension “D” allows for actuator removal without the need to remove the valve from the pipe.
5. Weather shields are available, dimensional data upon request.
6. Dual actuated valves have actuators mounted on a common valve shaft.
7. Belimo SY Series actuators are NEMA 4X rated.

Dimensions



Flow Pattern



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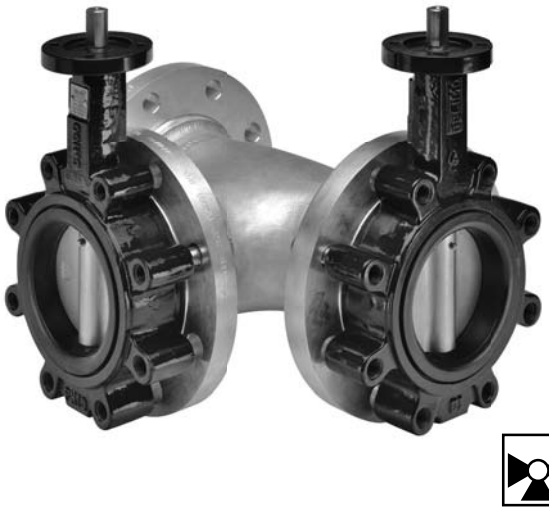
F7 Series 3-Way, HDU Butterfly Valve
Resilient Seat, 304 Stainless Disc



- **50 psi bubble tight shut-off**
- **Long stem design allows for 2" insulation**
- **Valve face-to-face dimensions comply with API 609 & MSS-SP-67**
- **Completely assembled and tested, ready for installation**
- **Tees comply with ASME/ANSI B16.1 Class 125 flanges**

Application

These valves are designed to meet the needs of HVAC and commercial applications requiring bubble tight shut off for liquids. Typical applications include chiller isolation, cooling tower isolation, change-over systems, large air handler coil control, bypass and process control applications. The large C_v values provide for an economical control valve solution for larger flow applications. Designed for use in Victaulic piping systems when mated to Victaulic 41 series flange nipples.

Jobsite Note

Valves should be stored in a weather protected area prior to construction. Complete installation recommendations can be found in Belimo's Installation and Maintenance Instructions for F7…HDU Butterfly Valves.

Technical Data	
Service	chilled, hot water, 60% glycol
Flow characteristic	modified linear
Controllable flow range	82°
Sizes	2" to 12"
Type of end fitting	for use with ANSI 125/150 flanges
Materials	
Body	ductile iron ASTM A536
Body finish	epoxy powder finish
Disc	304 stainless steel
Seat	EPDM standard
Shaft	416 stainless steel
O-ring	EPDM
Bushings	RPTFE
Media temperature range	-22°F to 250°F [-30°C to 120°C]
Body pressure rating	ASME/ANSI Class 125
Close-off pressure	50 psi
Rangeability	10:1 (for 30° to 70° range)
Maximum velocity	12 FPS
Leakage	bubble tight

		Valve Nominal Size		Type	Suitable Actuators			
C_v 90°	C_v 60°	IN	DN [mm]	3-way	Spring	Non-Spring		Electronic Fail-Safe
115	44	2"	50	F750HDU	AF Series	AM	SY Series	GK Series
196	75	2½"	65	F765HDU				
302	116	3"	80	F780HDU		GM Series		
600	230	4"	100	F7100HDU				
1022	392	5"	125	F7125HDU				
1579	605	6"	150	F7150HDU				
3136	1202	8"	200	F7200HDU				
5340	2047	10"	250	F7250HDU				
8250	3062	12"	300	F7300HDU				

			MOD								ON/OFF
Valve	Size	C_v	10°	20°	30°	40°	50°	60°	70°	80°	90°
F750HDU	2"	115	.06	3	7	15	27	44	70	105	115
F765HDU	2½"	196	.10	6	12	25	45	75	119	178	196
F780HDU	3"	302	.20	9	18	39	70	116	183	275	302
F7100HDU	4"	600	.30	17	36	78	139	230	364	546	600
F7125HDU	5"	1022	.50	29	61	133	237	392	620	930	1022
F7150HDU	6"	1579	.80	45	95	205	366	605	958	1437	1579
F7200HDU	8"	3136	2	89	188	408	727	1202	1903	2854	3136
F7250HDU	10"	5340	3	151	320	694	1237	2047	3240	4859	5340
F7300HDU	12"	8250	4	234	495	1072	1911	3062	5005	7507	8250

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F7 Series 3-Way, HDU Butterfly Valve
Resilient Seat, 304 Stainless Disc

Maximum Dimensions (Inches)

Valve	Size	C_v 90°	A	B	C	D(Max)	BHC	No. of Holes	Lug Bolt	Actuator	Close-Off (PSI)	
F750HDU	2”	115	4.50	6.15	6.15	15.50	4.75	4	5/8-11 UNC	AF	50	Spring Return
F765HDU	2½”	196	5.00	6.76	6.76	16.00	5.50	4	5/8-11 UNC	2*AF	50	
F780HDU	3”	302	5.50	7.28	7.28	16.25	6.00	4	5/8-11 UNC		50	
F780HDU	3”	302	5.50	7.28	7.28	21.00	6.00	4	5/8-11 UNC	GK	50	Electronic Fail-Safe
F7100HDU	4”	600	6.50	8.55	8.55	21.75	7.50	8	5/8-11 UNC	2*GK	50	
F7125HDU	5”	1022	7.50	9.64	9.64	22.25	8.50	8	3/4-10 UNC		50	
F7150HDU	6”	1579	8.00	10.19	10.19	22.75	9.50	8	3/4-10 UNC		50	
F750HDU	2”	115	4.50	6.65	6.15	15.50	4.75	4	5/8-11 UNC	AR	50	Non-Spring Return
F765HDU	2½”	196	5.00	6.76	6.76	16.00	5.50	4	5/8-11 UNC		50	
F780HDU	3”	302	5.50	7.28	7.28	21.00	6.00	4	5/8-11 UNC	GM	50	
F7100HDU	4”	600	6.50	8.54	8.54	21.75	7.50	8	5/8-11 UNC	2*GM	50	
F7125HDU	5”	1022	7.50	9.64	9.64	22.25	8.50	8	3/4-10 UNC		50	
F7150HDU	6”	1579	8.00	10.19	10.19	22.75	9.50	8	3/4-10 UNC		50	
F750HDU	2”	115	4.50	6.15	6.15	15.50	4.75	4	5/8-11 UNC	SY1…	50	
F765HDU	2½”	196	5.00	6.76	6.76	16.00	5.50	4	5/8-11 UNC		50	
F780HDU	3”	302	5.50	7.28	7.28	21.00	6.00	4	5/8-11 UNC	SY2…	50	
F7100HDU	4”	600	6.50	8.55	8.55	21.75	7.50	8	5/8-11 UNC		50	
F7125HDU	5”	1022	7.50	9.64	9.64	22.25	8.50	8	3/4-10 UNC		50	
F7150HDU	6”	1579	8.00	10.19	10.19	22.75	9.50	8	3/4-10 UNC		50	
F7200HDU	8”	3136	9.00	11.37	11.37	24.25	11.75	8	3/4-10 UNC	SY3…	50	
F7250HDU	10”	5340	11.00	13.58	13.58	30.00	14.25	12	7/8-9 UNC	SY4…	50	
F7300HDU	12”	8250	12.00	15.01	15.01	32.00	17.00	12	7/8-9 UNC		50	

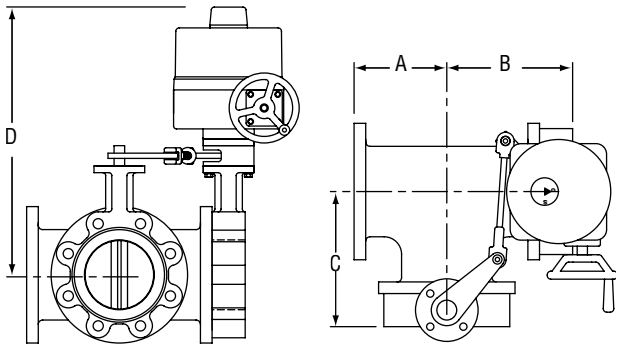
AF maximum actuator ambient temperature is 122°F.
SY... maximum actuator ambient temperature is 150°F.
Model SY1… does not have hand wheel-override is via 8mm wrench on bottom side of actuator.

Application Notes

1. Valves are rated at 50 psi differential pressure in the closed position.
2. Valves are furnished with lugs tapped for use with ANSI Class 125/150 flanges. Installation flanges and hardware are not included.
3. 3-way assemblies are furnished assembled and tested, ready for installation. **All 3-way assemblies require the customer to specify the 3-way configuration prior to order entry to guarantee correct placement of valves and actuators on the assembly.**
4. Dimension “D” allows for actuator removal without the need to remove the valve from the pipe.
5. Weather shields are available, dimensional data upon request.
6. Dual actuated valves have single actuators mounted on each valve shaft.
7. Bolts supplied are for shipping purposes only. Upon installation replace with an appropriate SAE grade 5 or better hardware.
8. Belimo SY Series actuators are NEMA 4X rated.

Dimensions

HS DWGP15



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Application:

The SY actuators are NEMA 4X rated and designed to meet the needs of HVAC and Commercial applications. Offered on Belimo standard and high performance valve series, these actuators are available for on/off and modulating applications.

Depending on the application, they are available in 24 VAC/ VDC, 120 VAC and 230 VAC.

Technical Data	
Electrical connection	½" conduit connector, screw terminals
Motor protection	H Class insulation (SY-1), F Class (SY-2…5)
Gear train	high alloy steel gear sets, self locking
Operating range	(SY…-24) on/off, floating point (SY...24MFT) 2-10 VDC, 4-20 mA, 0-10 VDC
Sensitivity	(SY…24MFT) 0.4 mA/200mV
Reversal hysteresis	(SY…24MFT)1.0 mA/500mV
Feedback	(SY…24MFT) 2-10 VDC
Angle of rotation	90°
Direction of rotation	reversible
Position indication	top mounted domed indicator
Internal humidity control	resistive heating element
Auxiliary switches	factory set for 5° and 85° change of state SY1: (2) SPDT, min 1 mA, 24 VAC; max 3A, 250 VAC. SY2-12: (2) SPDT, min 1 mA, 24 VAC; max 5A, 250 VAC.
Ambient temperature	-22°F to +150°F [-30°C to +65°C]
Humidity range	up to 95%
Housing type	IP67, NEMA 4X
Housing material	die cast aluminum alloy
Agency listings	ISO, CE, cCSAus

Power Supply 24 VAC/VDC 50/60Hz, single phase

Model	Torque	Speed	Power Consumption	Duty Cycle		Override	Weight
				On/Off	MFT		
SY1-24(P)	35Nm/310 in-lbs	15s	1.8A	30%	75%	8mm Wrench	2.0kg/4.9 lb.
SY2-24(MFT)	90Nm/801 in-lbs	15s	3.0A	30%	75%	Hand Wheel	11kg/24.5 lb.
SY3-24(MFT)	150Nm/1335 in-lbs	22s	3.0A	30%	75%	Hand Wheel	11kg/24.5 lb.
SY4-24(MFT)	400Nm/3560 in-lbs	16s	6.0A	30%	75%	Hand Wheel	22kg/48.5 lb.
SY5-24(MFT)	500Nm/4450 in-lbs	22s	6.5A	30%	75%	Hand Wheel	22kg/48.5 lb.

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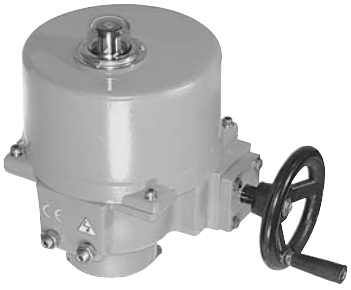
SY...120V Series Non-Spring Return Actuator
Technical Data - 120 VAC



Application:

The SY actuators are NEMA 4X rated and designed to meet the needs of HVAC and Commercial applications. Offered on Belimo standard and high performance valve series, these actuators are available for on/off and modulating applications. Depending on the application, they are available in 24 VAC/ VDC, 120 VAC and 230 VAC.

Technical Data	
Electrical connection	½" conduit connector, screw terminals
Motor protection	H Class insulation (SY-1), F Class (SY-2…12)
Gear train	high alloy steel gear sets, self locking
Operating range	(SY…-110) on/off, floating point (SY...120MFT) 2-10 VDC, 4-20 mA, 0-10 VDC
Sensitivity	(SY…120MFT) 0.4 mA/200mV
Reversal hysteresis	(SY…120MFT) 1.0 mA/500mV
Feedback	(SY…120MFT) 2-10 VDC
Angle of rotation	90°
Direction of rotation	reversible
Position indication	top mounted domed indicator
Internal humidity control	resistive heating element
Auxiliary switches	factory set for 5° and 85° change of state SY1: (2) SPDT, min 1 mA, 24 VAC; max 3A, 250 VAC. SY2-12: (2) SPDT, min 1 mA, 24 VAC; max 5A, 250 VAC.
Ambient temperature	-22°F to +150°F [-30°C to +65°C]
Humidity range	up to 95%
Housing type	IP67, NEMA 4X
Housing material	die cast aluminum alloy
Agency listings	ISO, CE, cCSAus

Note: Leakage current is possible (<3.5 mA).
Connect ground before applying voltage.

Power Supply 120 VAC 50/60Hz, single phase

Model	Torque	Speed 60Hz	Speed 50Hz	Power Consumption	Duty Cycle		Override	Weight
					On/Off	Proportional		
SY1-110(P)	35Nm/310 in-lbs	12s	13s	0.5A	30%	75%	8mm Wrench	2.0kg/4.9 lb.
SY2-120(MFT)	90Nm/801 in-lbs	15s	17s	1.0A	30%	75%	Hand Wheel	11kg/24.5 lb.
SY3-120(MFT)	150Nm/1335 in-lbs	22s	26s	1.0A	30%	75%	Hand Wheel	11kg/24.5 lb.
SY4-120(MFT)	400Nm/3560 in-lbs	16s	18s	1.3A	30%	75%	Hand Wheel	22kg/48.5 lb.
SY5-120(MFT)	500Nm/4450 in-lbs	22s	25s	1.5A	30%	75%	Hand Wheel	22kg/48.5 lb.
SY6-120(MFT)	650Nm/5785 in-lbs	28s	31s	1.8A	30%	75%	Hand Wheel	22kg/48.5 lb.
SY7-120(MFT)	1000Nm/8900 in-lbs	46s	55s	3.2A	30%	75%	Hand Wheel	36kg/79.5 lb.
SY8-120(MFT)	1500Nm/13350 in-lbs	46s	55s	4.0A	30%	75%	Hand Wheel	36kg/79.5 lb.
SY9-120(MFT)	2000Nm/17800 in-lbs	58s	70s	3.2A	30%	50%	Hand Wheel	56kg/123.5 lb.
SY10-120(MFT)	2500Nm/22250 in-lbs	58s	70s	4.0A	30%	50%	Hand Wheel	56kg/123.5 lb.
SY11-120(MFT)	3000Nm/26700 in-lbs	58s	70s	3.0A	30%	50%	Hand Wheel	56kg/123.5 lb.
SY12-120(MFT)	3500Nm/31150 in-lbs	58s	70s	4.0A	30%	50%	Hand Wheel	56kg/123.5 lb.

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Application:

The SY actuators are NEMA 4X rated and designed to meet the needs of HVAC and Commercial applications. Offered on Belimo standard and high performance valve series, these actuators are available for on/off and modulating applications. Depending on the application, they are available in 24 VAC/ VDC, 120 VAC and 230 VAC.

Technical Data	
Electrical connection	½" conduit connector, screw terminals
Overload protection	thermally protected 135°C cut-out
Motor protection	H Class insulation (SY-1), F Class (SY-2…12)
Gear train	high alloy steel gear sets, self locking
Operating range	(SY…-220) on/off, floating point (SY...230MFT) 2-10 VDC, 4-20 mA, 0-10 VDC
Sensitivity	(SY…230MFT) 0.4 mA/200mV
Reversal hysteresis	(SY…230MFT) 1.0 mA/500mV
Feedback	(SY…230MFT) 2-10 VDC
Angle of rotation	90°
Direction of rotation	reversible
Position indication	top mounted domed indicator
Internal humidity control	resistive heating element
Auxiliary switches	factory set for 5° and 85° change of state SY1: (2) SPDT, min 1 mA, 24 VAC; max 3A, 250 VAC. SY2-12: (2) SPDT, min 1 mA, 24 VAC; max 5A, 250 VAC.
Ambient temperature	-22°F to +150°F [-30°C to +65°C]
Humidity range	up to 95%
Housing type	IP67, NEMA 4X
Housing material	die cast aluminum alloy
Agency listings	ISO, CE, cCSAus

Power Supply 230 VAC 50/60Hz, single phase

Model	Torque	Speed 60Hz	Speed 50Hz	Power Consumption	Duty Cycle		Override	Weight
					On/Off	MFT		
SY1-220(P)	35Nm/310 in-lbs	12s	13s	0.3A	30%	75%	8mm Wrench	2.0kg/4.9 lb.
SY2-230(MFT)	90Nm/801 in-lbs	15s	17s	0.5A	30%	75%	Hand Wheel	11kg/24.5 lb.
SY3-230(MFT)	150Nm/1335 in-lbs	22s	26s	0.5A	30%	75%	Hand Wheel	11kg/24.5 lb.
SY4-230(MFT)	400Nm/3560 in-lbs	16s	18s	0.6A	30%	75%	Hand Wheel	22kg/48.5 lb.
SY5-230(MFT)	500Nm/4450 in-lbs	22s	25s	0.7A	30%	75%	Hand Wheel	22kg/48.5 lb.
SY6-230(MFT)	650Nm/5785 in-lbs	28s	31s	0.8A	30%	75%	Hand Wheel	22kg/48.5 lb.
SY7-230(MFT)	1000Nm/8900 in-lbs	46s	55s	1.6A	30%	75%	Hand Wheel	36kg/79.5 lb.
SY8-230(MFT)	1500Nm/13350 in-lbs	46s	55s	2.0A	30%	75%	Hand Wheel	36kg/79.5 lb.
SY9-230(MFT)	2000Nm/17800 in-lbs	58s	70s	1.6A	30%	50%	Hand Wheel	56kg/123.5 lb.
SY10-230(MFT)	2500Nm/22250 in-lbs	58s	70s	2.0A	30%	50%	Hand Wheel	56kg/123.5 lb.
SY11-230(MFT)	3000Nm/26700 in-lbs	58s	70s	1.6A	30%	50%	Hand Wheel	56kg/123.5 lb.
SY12-230(MFT)	3500Nm/31150 in-lbs	58s	70s	2.2A	30%	50%	Hand Wheel	56kg/123.5 lb.

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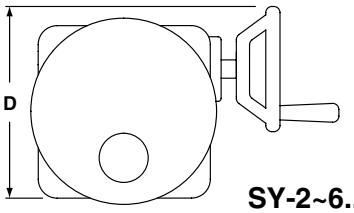
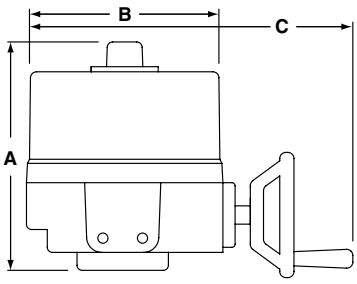
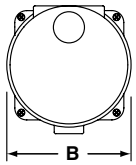
SY... Series Non-Spring Return Actuator Dimensions

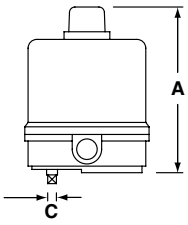


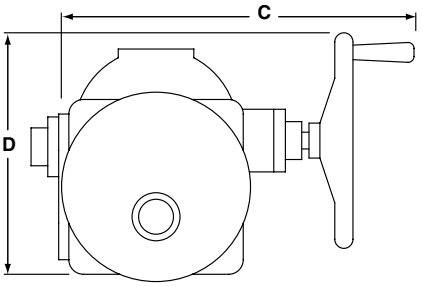
SY-2~6...

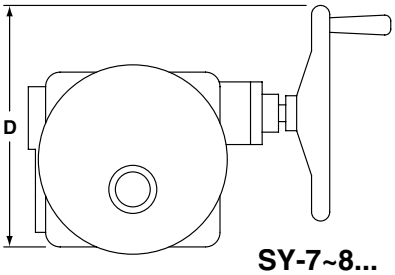




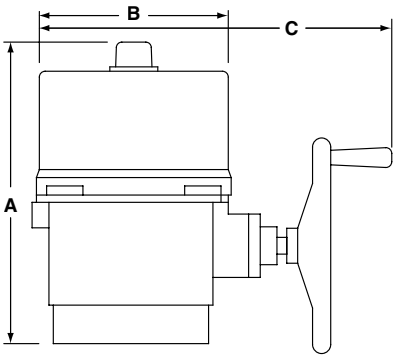
SY-1...

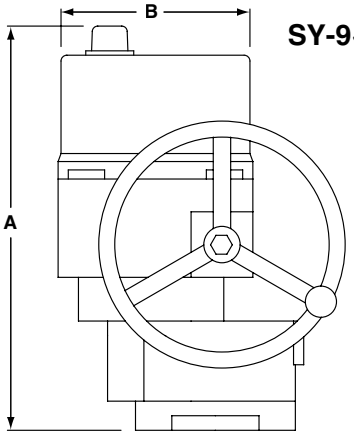






SY-7~8...





SY-9~12...

MODEL	DIM A (MAX)	Add to Dim A for cover removal	DIM B	DIM C (MAX)	DIM D
	Inches [mm]	Inches [mm]	Inches [mm]	Inches [mm]	Inches [mm]
SY1	6.10 [155]	3.94 [100]	4.25 [108]	8mm	-
SY2~3	10.04 [255]	7.48 [190]	7.87 [200]	12.99 [330]	7.87 [200]
SY4~6	12.40 [315]	8.86 [225]	9.21 [234]	14.96 [380]	11.81 [300]
SY7~8	16.54 [420]	8.86 [225]	9.21 [234]	17.72 [450]	13.39 [340]
SY9~12	23.23 [590]	8.86 [225]	10.24 [260]	18.50 [470]	13.78 [350]

Note: ~ indicates range of actuator i.e., SY2~3 = SY-2 and SY-3

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BELIMO

2 YEAR WARRANTY

CE LISTED 94 DS TEMP, IND, & REG. EQUIP. c UL us

BRUSHLESS DC motor

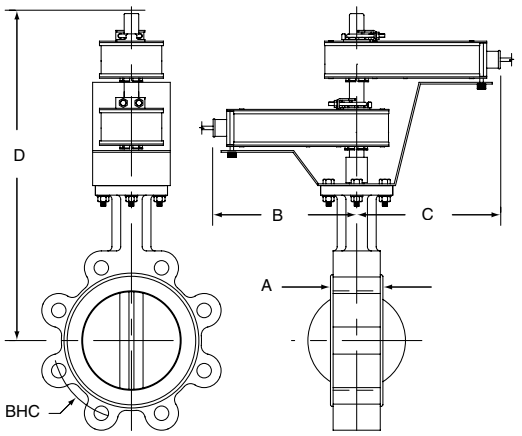
Models

AF24 US
AF24-S US w/built-in Aux. Switches
AF120 US
AF120-S US w/built-in Aux. Switches

Technical Data		
Control		on/off
Power consumption		
AF24(-S) US	running	5 W
	holding	1.5 W
AF120(-S) US	running	6 W
	holding	2.3 W
Transformer sizing		10 VA, class 2 power
Electrical connection		3 ft, 18 GA appliance cables (-S model has 2 cables) ½" conduit connector
Electrical protection		120 V actuators double insulated
Overload protection		electronic throughout 0° to 95° rotation
Angle of rotation		95°
Position indication		visual indicator
Manual override		hex crank
Running time	control	150 sec. independent of load
	spring	< 20 sec.
Ambient temperature		-22° F to 122° F [-30° C to 50° C]
Housing		NEMA 2 / IP54
Agency listings		UL 873, CSA C22.2 No. 24 certified, CE
Noise level		max. 45 dB(A)

AF…-S US	
Auxiliary switches	2 x SPDT, 7A (2.5A) @ 250 VAC, UL listed, one switch is fixed at +5°, one is adjustable 25° to 85° (double insulated)

Dimensions with 2-Way Valve



BF2WUDIM_A

		Dimensions (Inches)					Fail Safe (psi)	
Valve	Size	A	B	C	D(Max)	BHC	AF	2*AF
F650HD	2"	1.65	9.00	9.00	19.50	4.75	200	
F650HDU	2"	1.65	9.00	9.00	19.50	4.75	50	
F665HD	2½"	1.76	9.00	9.00	20.00	5.50		200
F665HDU	2½"	1.76	9.00	9.00	20.00	5.50	50	
F680HD	3"	1.78	9.00	9.00	20.50	6.00		200
F680HDU	3"	1.78	9.00	9.00	20.50	6.00		50
F6100HDU	4"	2.05	9.00	9.00	21.00	7.50		50
F6125HDU	5"	2.14	9.00	9.00	22.00	8.50		50
F650-150SHP	2"	1.75	9.00	9.00	19.50	4.75		150
F665-150SHP	2½"	1.88	9.00	9.00	20.00	5.50		150
F680-150SHP	3"	1.92	9.00	9.00	20.50	6.00		150
F6100-150SHP	4"	2.13	9.00	9.00	21.00	7.50		150
F650-300SHP	2"	1.75	9.00	9.00	19.50	5.00		150
F665-300SHP	2½"	1.88	9.00	9.00	20.00	5.88		150
F680-300SHP	3"	1.92	9.00	9.00	20.50	6.63		150
F6100-300SHP	4"	2.13	9.00	9.00	21.00	7.88		150

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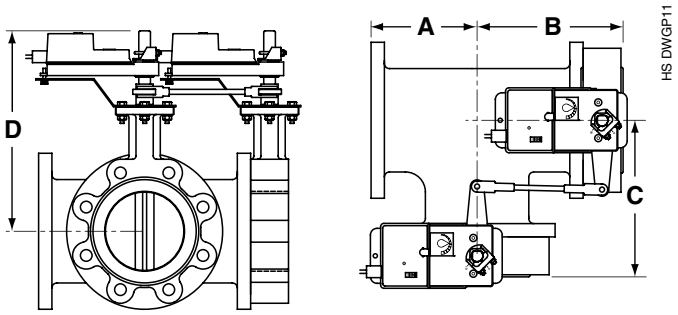
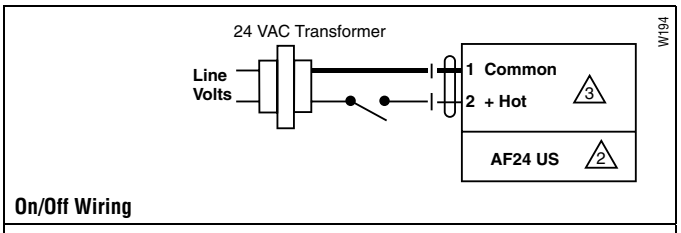
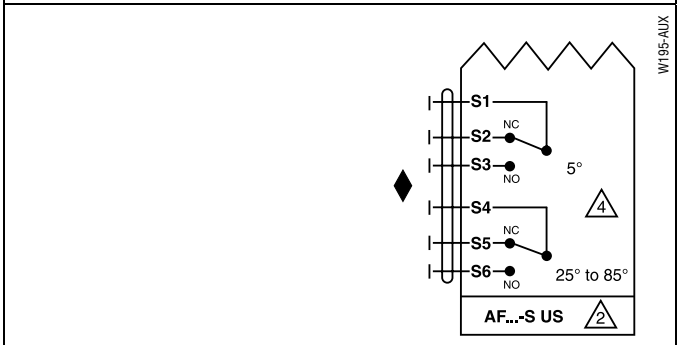
Dimensions with 3-Way Valve



		Dimensions (Inches)					Fail Safe (psi)	
Valve	**Size**	**A**	**B**	**C**	**D(Max)**	**BHC**	**AF**	**2*AF**
F750HD	2”	4.50	6.15	6.15	15.50	4.75	200	
F750HDU	2”	4.50	6.15	6.15	15.50	4.75	50	
F765HD	2½”	5.00	6.76	6.76	16.00	5.50		200
F765HDU	2½”	5.00	6.76	6.76	16.00	5.50		50
F780HDU	3”	5.50	7.28	7.28	16.25	6.00		50



On/Off Wiring



Auxiliary Switches

Wiring Diagrams

INSTALLATION NOTES

***CAUTION** Equipment damage!*

2 Actuators may be connected in parallel.
Power consumption must be observed.

3 Actuators may also be powered by 24 VDC.

4 For end position indication, interlock control, fan startup, etc., AF24-S US incorporates two built-in auxiliary switches: 2 x SPDT, 7A (2.5A) @ 250 VAC, UL listed, one switch is fixed at +5°, one is adjustable 25° to 85°.

APPLICATION NOTES

♦ Meets cULus or UL and CSA requirements without the need of an electrical ground connection.

***WARNING** Live Electrical Components!*

During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.

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AFBUP(-S)-X1, AFXUP(-S)-X1 Actuators, On/Off

2 YEAR WARRANTY

Models

AFBUP-X1
AFBUP-S-X1
AFXUP-X1
AFXUP-S-X1

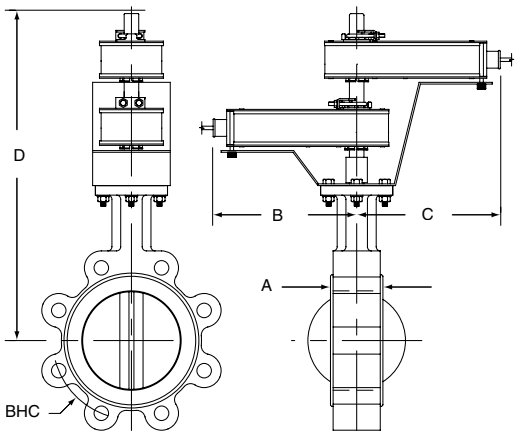
Technical Data

Power supply		24...240 VAC -20% / +10%, 50/60 Hz 24...125 VDC ±10%
Power consumption	running	7 W
	holding	3.5 W
Transformer sizing		7 VA @ 24 VAC (class 2 power source) 8.5 VA @ 120 VAC 18 VA @ 240 VAC
Electrical connection		
AFBUP...		3 ft, 18 GA appliance cable, 1/2" conduit connector **-S models:** Two 3 ft, 18 gauge appliance cables with 1/2" conduit connectors
AFXUP...		3 ft [1m], 10 ft [3m] or 16 ft [5m] 18 GA appliance cable, with or without 1/2" conduit connector **-S models:** Two 3 ft [1m], 10 ft [3m] or 16 ft [5m] appliance cables with or without 1/2" conduit connectors
Overload protection		Electronic throughout 0 to 95° rotation
Control		On/Off
Torque		180 in-lb [20 Nm] minimum
Direction of rotation	spring	reversible with CW/CCW mounting
Mechanical angle of rotation		95° (adjustable with mechanical end stop, 35° to 95°)
Running time	motor	< 75 sec
	spring	20 sec @ -4°F to 122°F [-20°C to 50°C]; < 60 sec @ -22°F [-30°C]
Position indication		visual indicator, 0° to 95° (0° is full spring return position)
Manual override		5 mm hex crank (3/16" Allen), supplied
Humidity		max. 95% RH non-condensing
Ambient temperature		-22°F to 122°F [-30°C to 50°C]
Storage temperature		-40°F to 176°F [-40°C to 80°C]
Housing		Nema 2, IP54, Enclosure Type2
Housing material		Zinc coated metal and plastic casing
Agency listings †		cULus acc. to UL60730-1A/-2-14, CAN/CSA E60730-1:02, CE acc. to 2004/108/EC & 2006/95/EC
Noise level		<50dB(A) motor @ 75 seconds ≤62dB(A) spring return
Servicing		maintenance free
Quality standard		ISO 9001
Weight		4.6 lbs (2.1 kg), 4.9 lbs (2.25 kg) with switches

† Rated Impulse Voltage 4kV, Type of action 1.AA (1.AA.B for -S version), Control Pollution Degree 3.

AFBUP-S-X1, AFXUP-S-X1	
Auxiliary switches	2 x SPDT 3A (0.5A) @ 250 VAC, UL Approved one set at +10°, one adjustable 10° to 90°

Dimensions with 2-Way Valve



BF2WUDIM_A

		Dimensions (Inches)					Fail Safe (psi)	
Valve	**Size**	**A**	**B**	**C**	**D(Max)**	**BHC**	**AF**	**2*AF**
F650HD	2"	1.65	9.00	9.00	19.50	4.75	200	
F650HDU	2"	1.65	9.00	9.00	19.50	4.75	50	
F665HD	2½"	1.76	9.00	9.00	20.00	5.50		200
F665HDU	2½"	1.76	9.00	9.00	20.00	5.50	50	
F680HD	3"	1.78	9.00	9.00	20.50	6.00		200
F680HDU	3"	1.78	9.00	9.00	20.50	6.00		50
F6100HDU	4"	2.05	9.00	9.00	21.00	7.50		50
F6125HDU	5"	2.14	9.00	9.00	22.00	8.50		50
F650-150SHP	2"	1.75	9.00	9.00	19.50	4.75		150
F665-150SHP	2½"	1.88	9.00	9.00	20.00	5.50		150
F680-150SHP	3"	1.92	9.00	9.00	20.50	6.00		150
F6100-150SHP	4"	2.13	9.00	9.00	21.00	7.50		150
F650-300SHP	2"	1.75	9.00	9.00	19.50	5.00		150
F665-300SHP	2½"	1.88	9.00	9.00	20.00	5.88		150
F680-300SHP	3"	1.92	9.00	9.00	20.50	6.63		150
F6100-300SHP	4"	2.13	9.00	9.00	21.00	7.88		150
F650VIC	2"	3.21	9.00	9.00	18.50	-	200	
F665VIC	2½"	3.77	9.00	9.00	19.75	-	50	
F665VIC	2½"	3.77	9.00	9.00	20.50	-		200
F680VIC	3"	3.77	9.00	9.00	20.50	-		50

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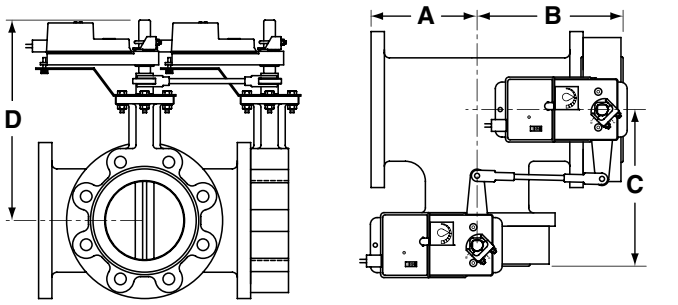
Dimensions with 3-Way Valve



		Dimensions (Inches)					Fail Safe (psi)	
Valve	Size	A	B	C	D(Max)	BHC	AF	2*AF
F750HD	2”	4.50	6.15	6.15	15.50	4.75	200	
F750HDU	2”	4.50	6.15	6.15	15.50	4.75	50	
F765HD	2½”	5.00	6.76	6.76	16.00	5.50		200
F765HDU	2½”	5.00	6.76	6.76	16.00	5.50		50
F780HDU	3”	5.50	7.28	7.28	16.25	6.00		50
F750VIC	2”	4.50	6.85	6.85	15.00	-	50	
F750VIC	2”	4.50	6.85	6.85	15.00	-		200
F765VIC	2½”	5.00	7.46	7.46	15.50	-		50

Typical Specification

On/Off spring return damper actuators shall be direct coupled type which require no crank arm and linkage and be capable of direct mounting to a jackshaft up to a 1.05” diameter. The actuators must be designed so that they may be used for either clockwise or counterclockwise fail-safe operation. Actuators shall be protected from overload at all angles of rotation. If required, two SPDT auxiliary switch shall be provided having the capability of one being adjustable. Actuators with auxiliary switches must be constructed to meet the requirements for Double Insulation so an electrical ground is not required to meet agency listings. Actuators shall be cULus approved and have a 5 year warranty, and be manufactured under ISO 9001 International Quality Control Standards. Actuators shall be as manufactured by Belimo.

Wiring Diagrams

INSTALLATION NOTES

1 Provide overload protection and disconnect as required.

2 ***CAUTION** Equipment Damage!*
Actuators may be connected in parallel.
Power consumption and input impedance must be observed.

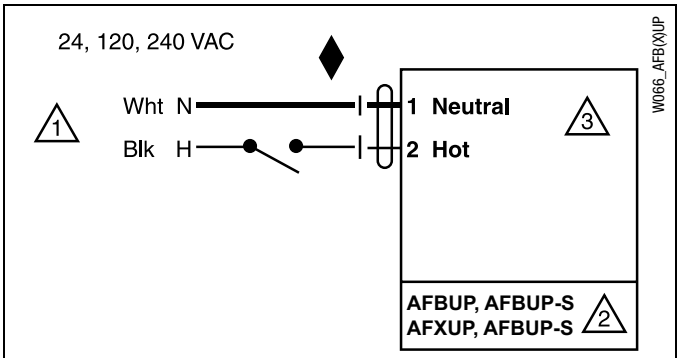
3 No ground connection is required.

4 For end position indication, interlock control, fan startup, etc., AFBUP-S-X1 and AFXUP-S-X1 incorporates two built-in auxiliary switches: 2 x SPDT, 3A (0.5A) @250 VAC, UL Approved, one switch is fixed at +10°, one is adjustable 10° to 90°.

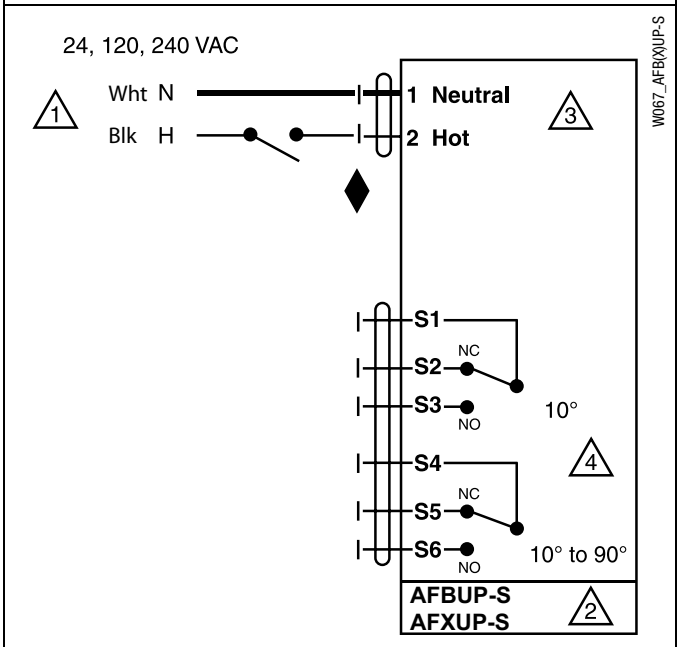
APPLICATION NOTES

Meets cULus requirements without the need of an electrical ground connection.

***WARNING** Live Electrical Components!*
During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.



On/Off wiring for AFBUP-X1, AFXUP-X1



Auxiliary Switches for AFBUP-S-X1, AFXUP-S-X1

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AF Actuators, Multi-Function Technology

2 YEAR WARRANTY

MFT CE LISTED 94 DS TEMP, IND, & REG. EQUIP. cULus BRUSHLESS dc. motor

Models

AFX24-MFT-X1
AFX24-MFT-S-X1 w/built-in Aux. Switches
2*AFX24-MFT-X1
2*AFX24-MFT-S-X1

Technical Data

Power supply	24 VAC, +/- 20%, 50/60 Hz 24 VDC, +20% / -10%
Power consumption♦ running	7.5 W
Power consumption♦ holding	3 W
Transformer sizing	10 VA (Class 2 power source)
Electrical connection	
AFX...	3 ft [1m] default, 10 ft [3m] or 16 ft [5m] 18 GA appliance or plenum cables, with or without 1/2" conduit connector **-S models:** two 3 ft [1m] default, 10 ft [3m] or 16 ft [5m] appliance cables with or without 1/2" conduit connectors
Overload protection	electronic throughout 0 to 95° rotation
Operating range Y*	2 to 10 VDC, 4 to 20 mA (default) variable (VDC, PWM, floating point, on/off)
Input impedance	100 kΩ for 2 to 10 VDC (0.1 mA) 500 Ω for 4 to 20 mA 1500 Ω for PWM, floating point and on/off control
Feedback output U*	2 to 10 VDC, 0.5 mA max
Torque	minimum 180 in-lb (20 Nm)
Direction of rotation* spring	reversible with cw/ccw mounting
Direction of rotation* motor	reversible with built-in switch
Mechanical angle of rotation*	95° (adjustable with mechanical end stop, 35° to 95°)
Running time spring	<20 sec @ -4°F to 122°F [-20° C to 50° C]; <60 sec @ -22°F [-30° C]
Running time motor*	150 seconds (default), variable (70 to 220 seconds)
Angle of rotation adaptation	off (default)
Override control*	min position = 0% mid. position = 50% max. position = 100%
Position indication	visual indicator, 0° to 95° (0° is spring return position)
Manual override	5 mm hex crank (3⁄16" Allen), supplied
Humidity	max. 95% RH, non-condensing
Ambient temperature	-22 to 122° F (-30 to 50° C)
Storage temperature	-40 to 176° F (-40 to 80° C)
Housing	NEMA 2, IP54, Enclosure Type 2
Housing material	zinc coated metal and plastic casing
Noise level	≤40dB(A) motor @ 150 seconds, run time dependent ≤62dB(A) spring return
Agency listings †	cULus acc. to UL60730-1A/-2-14, CAN/CSA E60730-1:02, CE acc. to 2004/108/EC & 2006/95/EC
Quality standard	ISO 9001
Servicing	maintenance free
Weight	4.6 lbs. (1.9 kg), 4.9 lbs. (2 kg) with switch

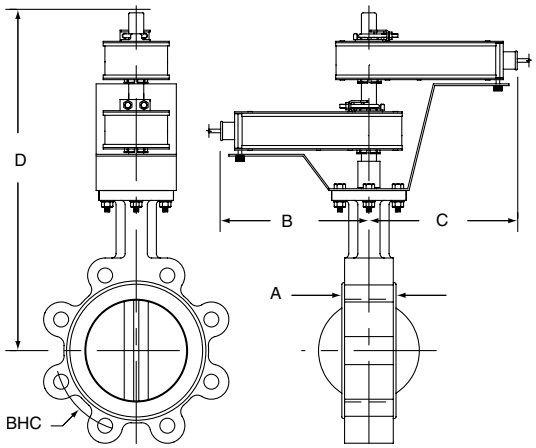
* Variable when configured with MFT options

† Rated Impulse Voltage 800V, Type of action 1.AA (1.AA.B for -S version), Control Pollution Degree 3.

♦ Programmed for 70 sec motor run time. At 150 sec motor run time, transformer sizing is 8.5 VA and power consumption is 6 W running / 3 W holding.

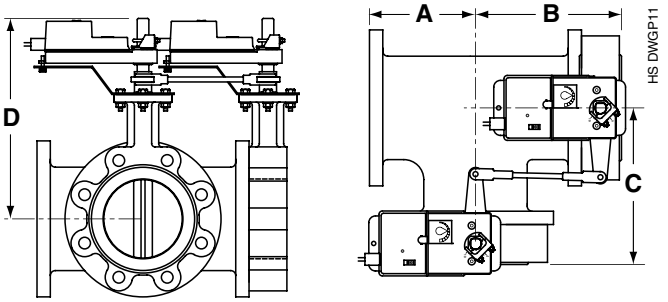
AFX24-MFT-S-X1	
Auxiliary switches	2 x SPDT 3A (0.5A) @ 250 VAC, UL approved one set at +10°, one adjustable 10° to 90°

Dimensions with 2-Way Valve



		Dimensions (Inches)					Fail Safe (psi)	
Valve	Size	A	B	C	D(Max)	BHC	AF	2*AF
F650HD	2"	1.65	9.00	9.00	19.50	4.75	200	
F650HDU	2"	1.65	9.00	9.00	19.50	4.75	50	
F665HD	2½"	1.76	9.00	9.00	20.00	5.50		200
F665HDU	2½"	1.76	9.00	9.00	20.00	5.50	50	
F680HD	3"	1.78	9.00	9.00	20.50	6.00		500
F680HDU	3"	1.78	9.00	9.00	20.50	6.00		50
F6100HDU	4"	2.05	9.00	9.00	21.00	7.50		50
F6125HDU	5"	2.14	9.00	9.00	22.00	8.50		50
F650-150SHP	2"	1.75	9.00	9.00	19.50	4.75		150
F665-150SHP	2½"	1.88	9.00	9.00	20.00	5.50		150
F680-150SHP	3"	1.92	9.00	9.00	20.50	6.00		150
F6100-150SHP	4"	2.13	9.00	9.00	21.00	7.50		150
F650-300SHP	2"	1.75	9.00	9.00	19.50	5.00		150
F665-300SHP	2½"	1.88	9.00	9.00	20.00	5.88		150
F680-300SHP	3"	1.92	9.00	9.00	20.50	6.63		150
F6100-300SHP	4"	2.13	9.00	9.00	21.00	7.88		150
F650VIC	2"	3.21	8.60	8.60	18.25	-		200
F665VIC	2½"	3.77	8.60	8.60	18.70	-		200
F680VIC	3"	3.77	8.60	8.60	18.70	-		50

Dimensions with 3-Way Valve



		Dimensions (Inches)					Fail Safe (psi)	
Valve	Size	A	B	C	D(Max)	BHC	AF	2*AF
F750HD	2"	4.50	6.15	6.15	15.50	4.75	200	
F750HDU	2"	4.50	6.15	6.15	15.50	4.75	50	
F765HD	2½"	5.00	6.76	6.76	16.00	5.50		200
F765HDU	2½"	5.00	6.76	6.76	16.00	5.50		50
F780HDU	3"	5.50	7.28	7.28	16.25	6.00		50
F750VIC	2"	4.50	6.85	6.85	15.00	-	50	
F750VIC	2"	4.50	6.85	6.85	15.00	-		200
F765VIC	2½"	5.00	7.46	7.46	15.00	-		50

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Wiring Diagrams

INSTALLATION NOTES

3 Actuators may also be powered by 24 VDC.

4 IN4004 or IN4007 diode (IN4007 supplied, Belimo part number 40155).

5 Triac A and B can also be contact closures.

6 Control signal may be pulsed from either the Hot (Source) or Common (Sink) 24 VAC line.

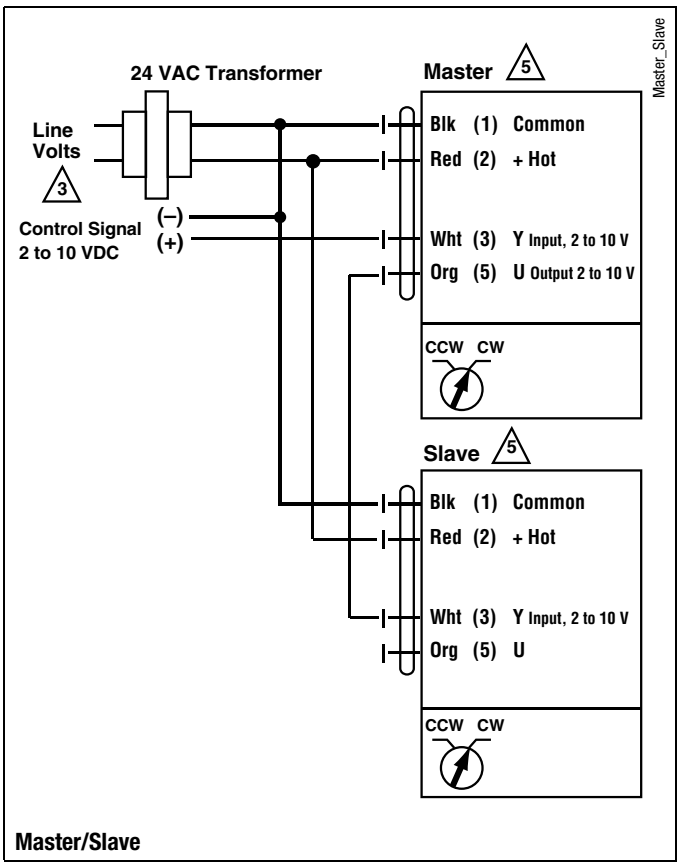
7 Position feedback cannot be used with Triac sink controller. The actuators internal common reference is not compatible.

APPLICATION NOTES

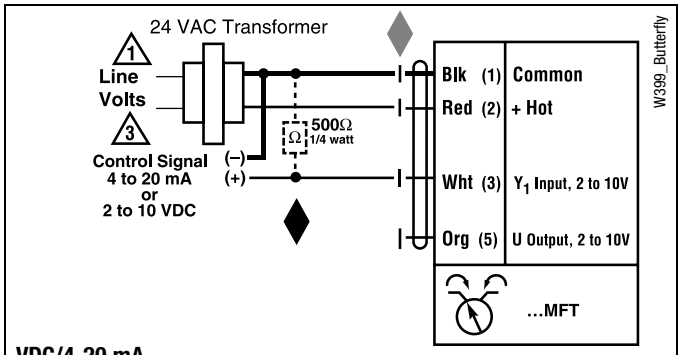
- The ZG-R01 500 Ω resistor converts the 4 to 20 mA control signal to 2 to 10 VDC, up to 2 actuators may be connected in parallel.
- Meets cULus or UL and CSA requirements without the need of an electrical ground connection.

WARNING *Live Electrical Components!*

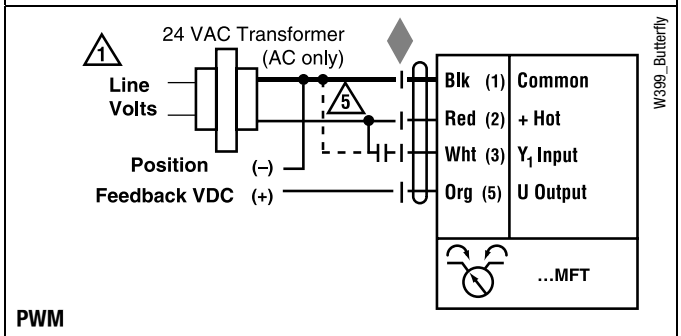
During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.



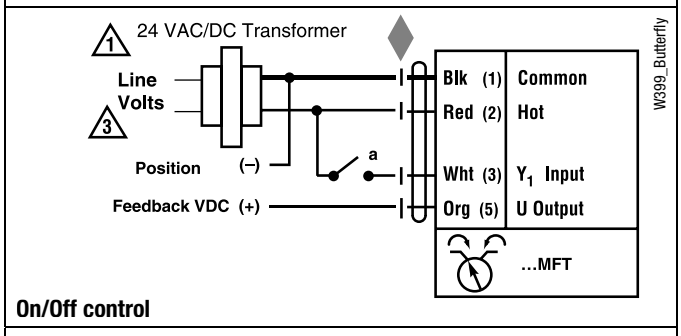
Master/Slave



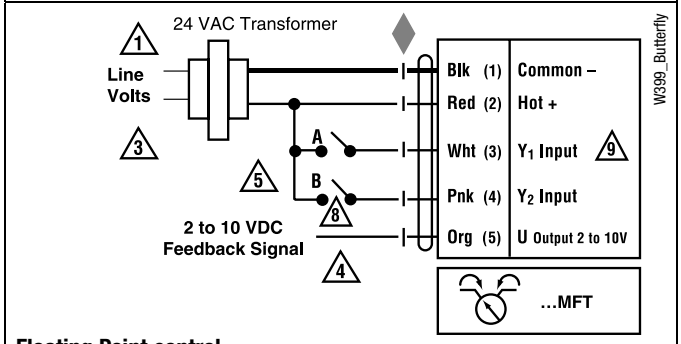
VDC/4-20 mA



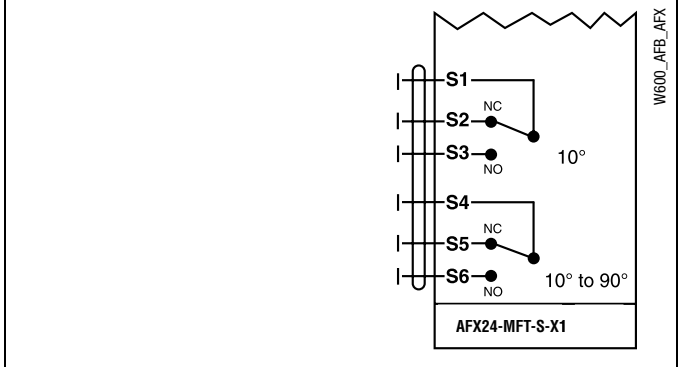
PWM



On/Off control



Floating Point control



Auxiliary Switches for AFX24-MFT-S-X1

050904 - 02/12 - Subject to change. © Belimo Aircontrols (USA), Inc.

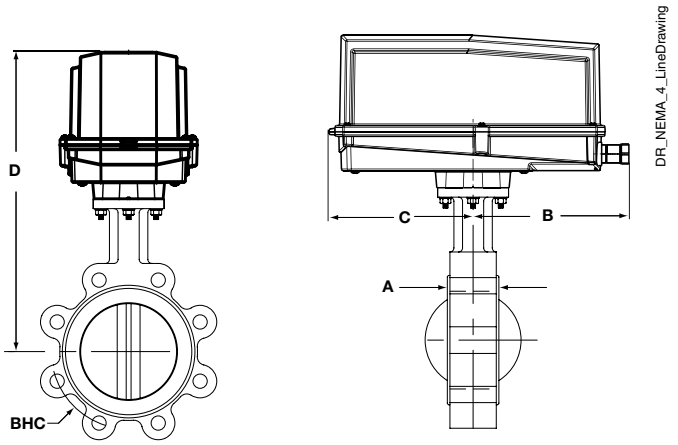
DKRX24-3-T, DKRX(B)24-3-T N4(H)
NEMA 2/NEMA 4 Actuators, On/Off, Floating Point

Models

DKRX24-3-T	w/terminal block
DKRX24-3-T N4	w/terminal block
DKRB24-3-T N4H	w/heater

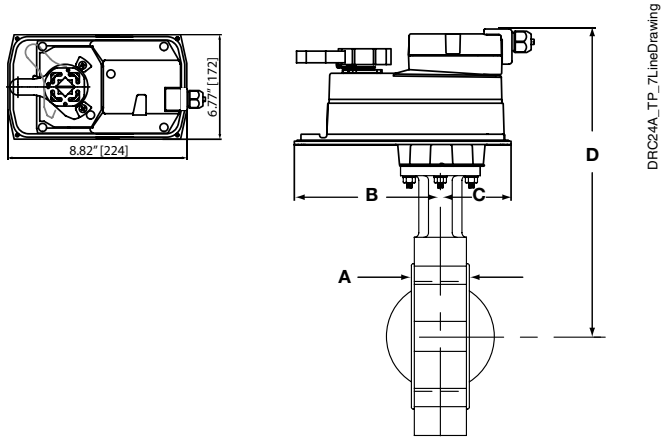
Technical Data	
Control	on/off, floating point
Power supply	24 VAC ± 20/-10% 50/60 Hz
Power consumption running	12W / heater 33W
holding	3W
Transformer sizing	21 VA (class 2 power source) / heater 36 VA
Electrical connection	screw terminal (for 22 to 12 AWG wire)
Overload protection	electronic throughout 0° to 90° rotation
Input impedance	100 Ω at control input 1500 Ω floating point
Angle of rotation	90°
Position indication	visual pointer (N4)
Manual override	internal push button (UL Type 4) external push buttom (UL Type 2)
Running time	150 seconds (default)
Fail-Safe	35 seconds
Humidity	5 to 100% RH (UL Type 4) 5 to 95% RH non condensation (UL Type 2)
Ambient temperature	-22°F to 122°F [-30°C to 50°C]
Storage temperature	-40°F to 176°F [-40°C to 80°C]
Housing type	UL Type 4/NEMA 4/IP66 UL Type 2/NEMA 2/IP54
Housing material	Polycarbonate
Agency listings	cULus according to UL 60730-1A, UL 60730-2-14 and CAN/CSA E60730-1; Certified to IEC/EN 60730-1 and IEC/EN 60730-2-14
EMC	CE according to 2004/108/EC
Quality standard	ISO 9001
Servicing	maintenance free

Dimensions with 2-Way Valve



Valve Body	Valve Nominal Size Inches	DN [mm]	A	B	C	D	FLG
F6100HD	4"	100	2.05 [52.1]	7.34 [186]	6.77 [172]	15.47 [393]	F07
F6150HDU	6"	150	2.19 [55.6]	7.34 [186]	6.77 [172]	16.47 [418]	F07

Dimensions without Housing



Valve Body	Valve Nominal Size Inches	DN [mm]	A	B	C	D	FLG
F6100HD	4"	100	2.05 [52.1]	5.81 [148]	2.64 [67.1]	13.25 [337]	F07
F6150HDU	6"	150	2.19 [55.6]	5.81 [148]	2.64 [67.1]	14.25 [362]	F07

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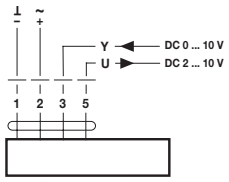
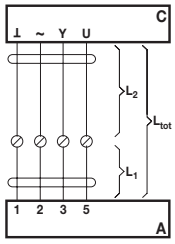
Electrical Installation

Wiring diagram

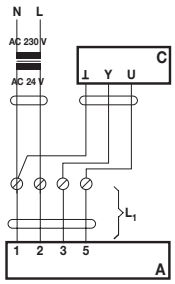
Note
- Connect via safety isolation transformer.
- Parallel connection of other actuators possible. Note performance data for supply.



Cable lengths



Note
When several actuators are connected in parallel, the maximum cable length must be divided by the number of actuators.



Note
There are no special restrictions on installation if the supply and data cable are routed separately.

Cable colors:
1 = black
2 = red
3 = white
5 = orange

A = Actuator
C = Control unit
L_1 = Belimo connecting cable, 1 m (4 x 0.75 mm²)
L_2 = Customer cable
L_{tot} = Maximum cable length

Cross section L_2 ⊥ / ~	Max. cable length $L_{tot} = L_1 + L_2$		Example for DC
	AC	DC	
0.75 mm²	≤30 m	≤5 m	1 m (L_1) + 4 m (L_2)
1.00 mm²	≤40 m	≤8 m	1 m (L_1) + 7 m (L_2)
1.50 mm²	≤70 m	≤12 m	1 m (L_1) + 11 m (L_2)
2.50 mm²	≤100 m	≤20 m	1 m (L_1) + 19 m (L_2)

A = Actuator
C = Control unit
L_1 = Belimo connecting cable, 1 m (4 x 0.75 mm²)

Wiring Diagrams

INSTALLATION NOTES

1 Provide overload protection and disconnect as required.

2 ***CAUTION*** *Equipment Damage!*
Actuators may be connected in parallel if not mechanically mounted to the same shaft. Power consumption and input impedance must be observed.

4 Position feedback cannot be used with Triac sink controller.
The actuator internal common reference is not compatible.

5 Control signal may be pulsed from either the Hot (source) or the Common (sink) 24 VAC line.

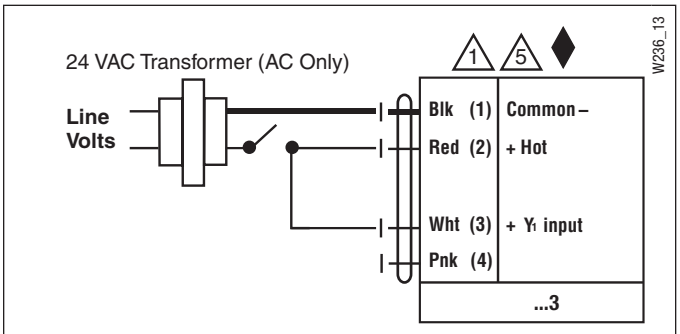
8 Contact closures A & B also can be triacs.
A & B should both be closed for triac source and open for triac sink.

9 For triac sink the common connection from the actuator must be connected to the hot connection of the controller.

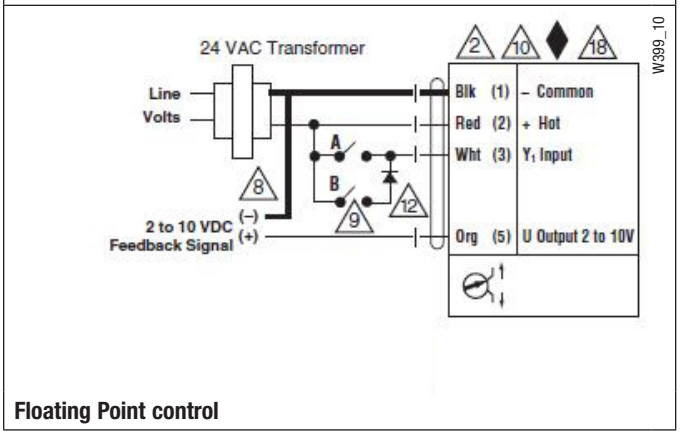
APPLICATION NOTES

Meets UL requirements without the need of an electrical ground connection.

WARNING *Live Electrical Components!*
During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.



On/Off control



Floating Point control

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DKRX24-MFT-T, DKRX(B)24-MFT-T N4(H)
NEMA 2/NEMA 4 Actuators, Multi-Function Technology

2 YEAR WARRANTY

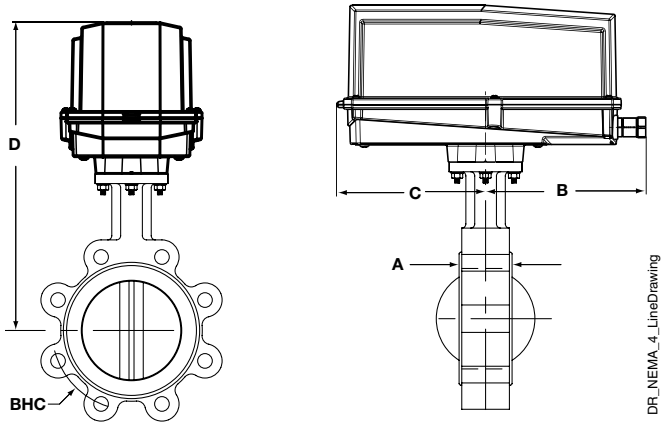
MFT

Models

DKRX24-MFT-T	w/terminal block
DKRX24-MFT-T N4	w/terminal block
DKRB24-MFT-T N4H	w/heater

Technical Data	
Control	2 to 10 VDC, 4 to 20 mA (default) variable (VDC, floating point, on/off)
Power supply	24 VAC ± 20% 50/60 Hz 24 VDC ± 10%
Power consumption running	12 W / heater 33W
holding	3 W
Transformer sizing	21 VA (class 2 power source) / heater 36 VA
Electrical connection	screw terminal (for 22 to 12 AWG wire)
Overload protection	electronic throughout 0° to 90° rotation
Input impedance	100 kΩ (0.1 mA) 500 Ω 1500 Ω (floating point, on/off)
Angle of rotation	90° electronically variable
Position indication	visual pointer (N4)
Manual override	internal push button (UL Type 4) external push buttom (UL Type 2)
Running time	150 seconds (default) variable (75 to 290 seconds)
Fail-Safe	35 seconds
Humidity	5 to 100% RH (UL Type 4) 5 to 95% RH non condensation (UL Type 2)
Ambient temperature	-22°F to 122°F [-30°C to 50°C]
Storage temperature	-40°F to 176°F [-40°C to 80°C]
Housing type	UL Type 4/NEMA 4/IP66 UL Type 2/NEMA 2/IP54
Housing material	Polycarbonate
Agency listings	cULus according to UL 60730-1A, UL 60730-2-14 and CAN/CSA E60730-1; Certified to IEC/EN 60730-1 and IEC/EN 60730-2-14
EMC	CE according to 2004/108/EC
Quality standard	ISO 9001
Servicing	maintenance free

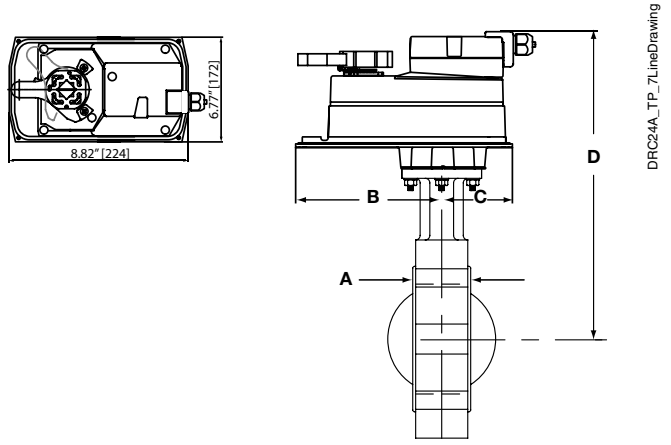
Dimensions with 2-Way Valve



Valve Body	Valve Nominal Size Inches	DN [mm]	A	B	C	D	FLG
F6100HD	4"	100	2.05 [52.1]	7.34 [186]	6.77 [172]	15.47 [393]	F07
F6150HDU	6"	150	2.19 [55.6]	7.34 [186]	6.77 [172]	16.47 [418]	F07

Dimensions (Inches [mm])

Dimensions without Housing



Valve Body	Valve Nominal Size Inches	DN [mm]	A	B	C	D	FLG
F6100HD	4"	100	2.05 [52.1]	5.81 [148]	2.64 [67.1]	13.25 [337]	F07
F6150HDU	6"	150	2.19 [55.6]	5.81 [148]	2.64 [67.1]	14.25 [362]	F07

Dimensions (Inches [mm])

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Wiring Diagrams

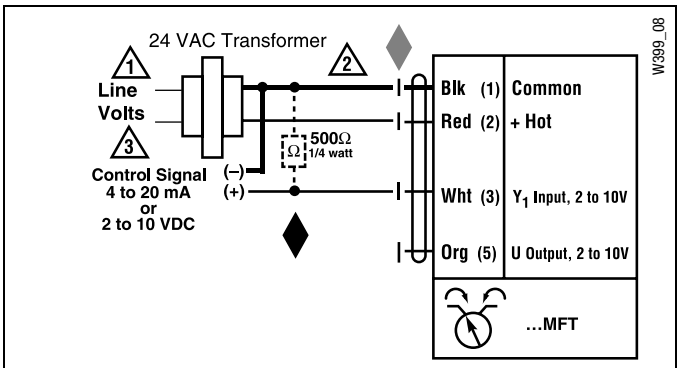
INSTALLATION NOTES

1. Provide overload protection and disconnect as required.
2. ***CAUTION*** *Equipment Damage!*
   Actuators may be connected in parallel if not mechanically mounted to the same shaft. Power consumption and input impedance must be observed.
3. Actuators may also be powered by 24 VDC.
4. Position feedback cannot be used with Triac sink controller. The actuator internal common reference is not compatible.
5. Control signal may be pulsed from either the Hot (source) or the Common (sink) 24 VAC line.
8. Contact closures A & B also can be triacs. A & B should both be closed for triac source and open for triac sink.
9. For triac sink the common connection from the actuator must be connected to the hot connection of the controller.

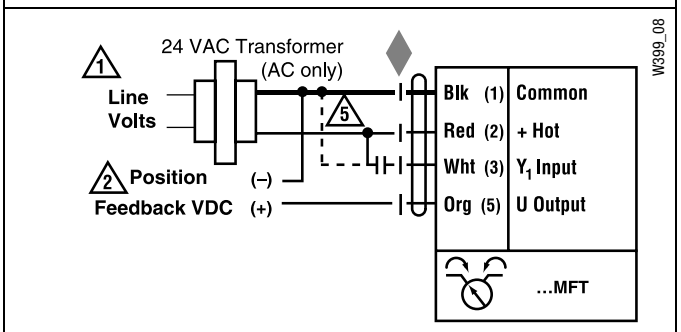
APPLICATION NOTES

- Meets UL requirements without the need of an electrical ground connection.
- The ZG-R01 500 Ω resistor may be used.

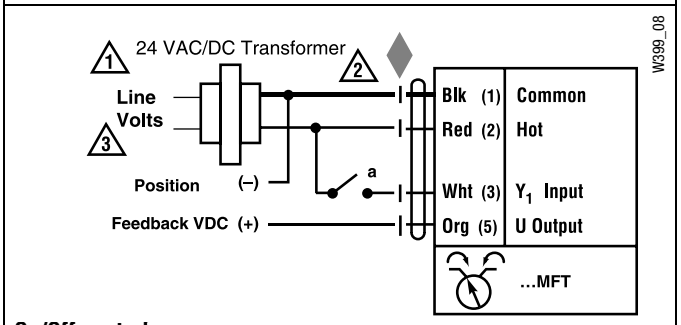
WARNING *Live Electrical Components!*
During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.



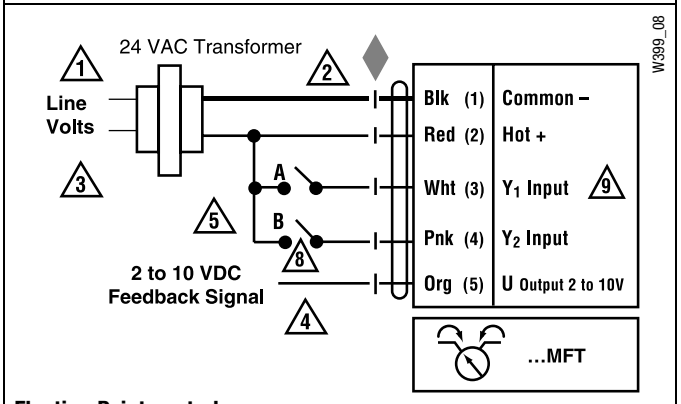
VDC/4-20 mA



PWM



On/Off control



Floating Point control

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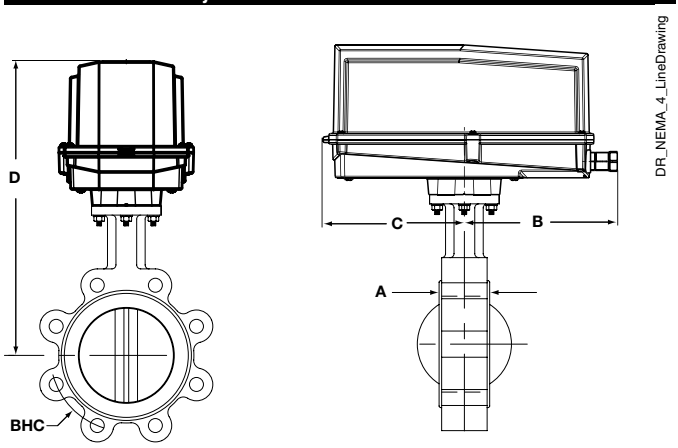
DRCX24-3-T, DRCX(B)24-3-T N4(H)
NEMA 2/NEMA 4 Actuators, On/Off, Floating Point

Models

DRCX24-3-T	w/terminal block
DRCX24-3-T N4	w/terminal block
DRCB24-3-T N4H	w/heater

Technical Data	
Control	on/off, floating point
Power supply	24 VAC ± 20/-10% 50/60 Hz 24 VDC ± 10%
Power consumption running	9W / heater 29W
holding	2W
Transformer sizing	12 VA (class 2 power source) / heater 27 VA
Electrical connection	screw terminal (for 22 to 12 AWG wire)
Overload protection	electronic throughout 0° to 90° rotation
Input impedance	1000 Ω at control input
Angle of rotation	90°
Position indication	visual pointer
Manual override	internal push button (UL Type 4) external push buttom (UL Type 2)
Running time	35 seconds (default)
Humidity	5 to 100% RH (UL Type 4) 5 to 95% RH non condensation (UL Type 2)
Ambient temperature	-22°F to 122°F [-30°C to 50°C]
Storage temperature	-40°F to 176°F [-40°C to 80°C]
Housing type	UL Type 4/NEMA 4/IP66 UL Type 2/NEMA 2/IP54
Housing material	Polycarbonate
Agency listings	cULus according to UL 60730-1A, UL 60730-2-14 and CAN/CSA E60730-1; Certified to IEC/EN 60730-1 and IEC/EN 60730-2-14
EMC	CE according to 2004/108/EC
Quality standard	ISO 9001

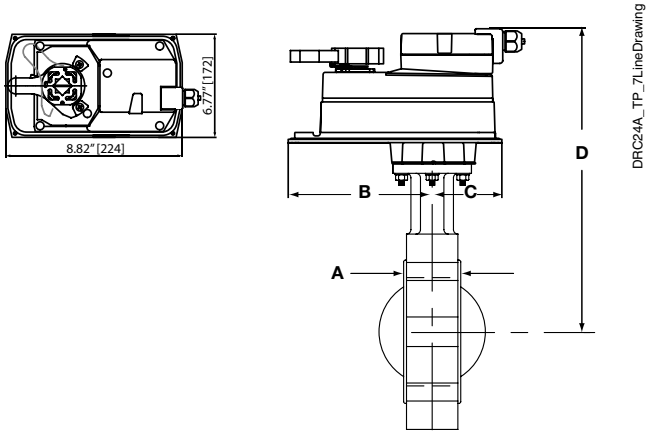
Dimensions with 2-Way Valve



Valve Nominal Size — **Dimensions (Inches [mm])**

Valve Body	Inches	DN [mm]	A	B	C	D	FLG
F6100HD	4"	100	2.05 [52.1]	7.34 [186]	6.77 [172]	15.47 [393]	F07
F6150HDU	6"	150	2.19 [55.6]	7.34 [186]	6.77 [172]	16.47 [418]	F07

Dimensions without Housing



Valve Nominal Size — **Dimensions (Inches [mm])**

Valve Body	Inches	DN [mm]	A	B	C	D	FLG
F6100HD	4"	100	2.05 [52.1]	6.00 [152]	3.00 [76.2]	13.38 [340]	F07
F6150HDU	6"	150	2.19 [55.6]	6.02 [153]	3.02 [76.7]	13.53 [344]	F07

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Wiring Diagrams

INSTALLATION NOTES

△2 ***CAUTION** Equipment damage!*
Actuators may be connected in parallel.
Power consumption and input impedance must be observed.

△4 Actuators may also be powered by 24 VDC.

△5 Actuators with plenum rated cable do not have numbers on wires; use color codes instead. Actuators with appliance cables are numbered.

△8 Control signal may be pulsed from either the Hot (Source) or Common (Sink) 24 VAC line.

△9 Contact closures A & B also can be triacs. A & B should both be closed for triac source and open for triac sink.
For triac sink the Common connection from the actuator must be connected to the Hot connection of the controller. Position feedback cannot be used with a Triac sink controller. The actuator internal common reference is not compatible.

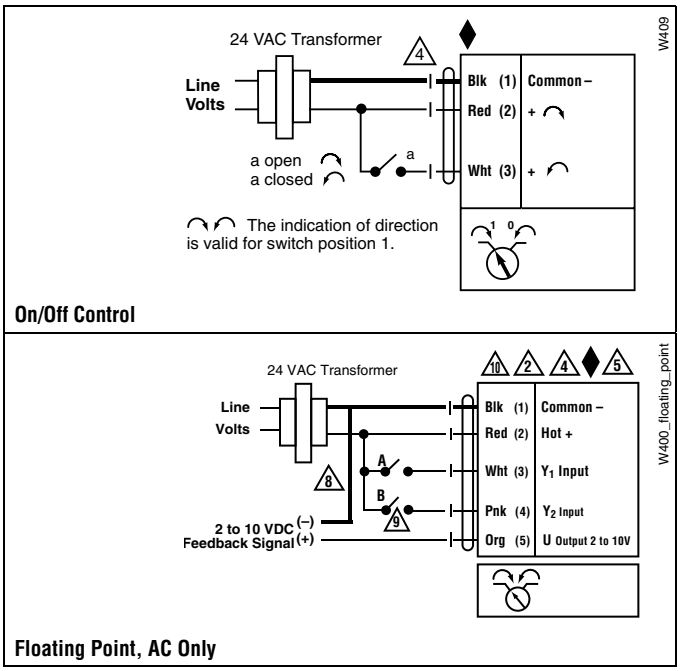
△10

APPLICATION NOTES

♦ Meets cULus or UL and CSA requirements without the need of an electrical ground connection.

⚠ ***WARNING** Live Electrical Components!*
During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.

⚠ ***WARNING** Mechanical Precautions*
The mechanical end stops cannot be moved or repositioned. Doing so will adversely effect the operation of the valve.
The directional switch cannot be moved. Maintain Factory Settings



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DRX24-MFT-T, DRX24-MFT-T N4, DRCX24-MFT-T, DRCX(B)24-MFT-T N4(H)
NEMA 2/NEMA 4 Actuators, Multi-Function Technology

MFT 2 YEAR WARRANTY

CE LISTED 94 05 TEMP.IND. & REG.EQUIP. c UL us

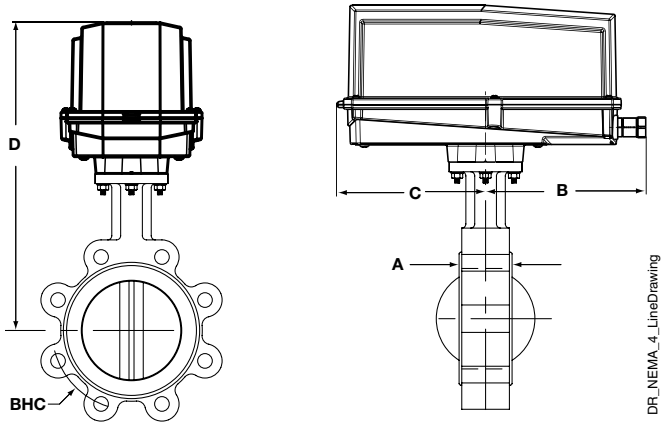
Brushless DC motor

Models

DRX24-MFT-T	w/terminal block
DRX24-MFT-T N4	w/terminal block
DRCX24-MFT-T	w/terminal block
DRCX24-MFT-T N4	w/terminal block
DRCB24-MFT-T N4H	w/heater

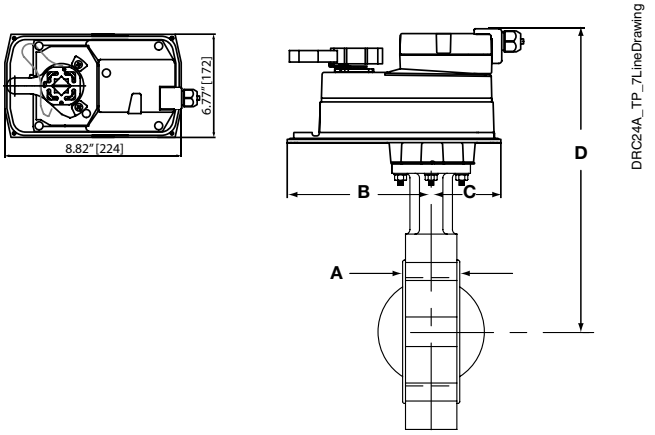
Technical Data		
Control		2 to 10 VDC, 4 to 20 mA (default) variable (VDC, floating point, on/off)
Power supply		24 VAC ± 20% 50/60 Hz 24 VDC ± 10%
Power consumption	running	6.5 W / heater 27W
	holding	2.5 W
Transformer sizing		9.5 VA (class 2 power source) / heater 25 VA
Electrical connection		screw terminal (for 22 to 12 AWG wire)
Overload protection		electronic throughout 0° to 90° rotation
Input impedance		100 kΩ for 2 to 10 VDC (0.1 mA) 500 Ω for 4 to 20 mA 1000 Ω for floating point and on-off control
Angle of rotation		90° electronically variable
Position indication		visual pointer
Manual override		internal push button (UL Type 4) external push buttom (UL Type 2)
Running time		
DRX...		150 seconds
DRCX...		35 seconds
Humidity		5 to 100% RH (UL Type 4) 5 to 95% RH non condensation (UL Type 2)
Ambient temperature		-22°F to 122°F [-30°C to 50°C]
Storage temperature		-40°F to 176°F [-40°C to 80°C]
Housing type		UL Type 4/NEMA 4/IP66 UL Type 2/NEMA 2/IP54
Housing material		Polycarbonate
Agency listings		cULus according to UL 60730-1A, UL 60730-2-14 and CAN/CSA E60730-1; Certified to IEC/EN 60730-1 and IEC/EN 60730-2-14"
EMC		CE according to 2004/108/EC
Quality standard		ISO 9001

Dimensions with 2-Way Valve



Valve Nominal Size			Dimensions (Inches [mm])				
Valve Body	Inches	DN [mm]	A	B	C	D	FLG
F6100HD	4"	100	2.05 [52.1]	7.34 [186]	6.77 [172]	15.47 [393]	F07
F6150HDU	6"	150	2.19 [55.6]	7.34 [186]	6.77 [172]	16.47 [418]	F07

Dimensions without Housing



Valve Nominal Size			Dimensions (Inches [mm])				
Valve Body	Inches	DN [mm]	A	B	C	D	FLG
F6100HD	4"	100	2.05 [52.1]	5.81 [148]	2.64 [67.1]	13.25 [337]	F07
F6150HDU	6"	150	2.19 [55.6]	5.81 [148]	2.64 [67.1]	14.25 [362]	F07

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Wiring Diagrams

INSTALLATION NOTES

CAUTION *Equipment damage!*
Actuators may be connected in parallel.
Power consumption and input impedance must be observed.

3 Actuators may also be powered by 24 VDC.

5 Actuators with plenum rated cable do not have numbers on wires; use color codes instead. Actuators with appliance cables are numbered.

8 Control signal may be pulsed from either the Hot (source) or the Common (sink) 24 VAC line.

9 Contact closures A & B also can be triacs.
A& B should both be closed for triac source and open for triac sink.

10 For triac sink the Common connection from the actuator must be connected to the Hot connection of the controller. Position feedback cannot be used with a Triac sink controller. The actuator internal common reference is not compatible.

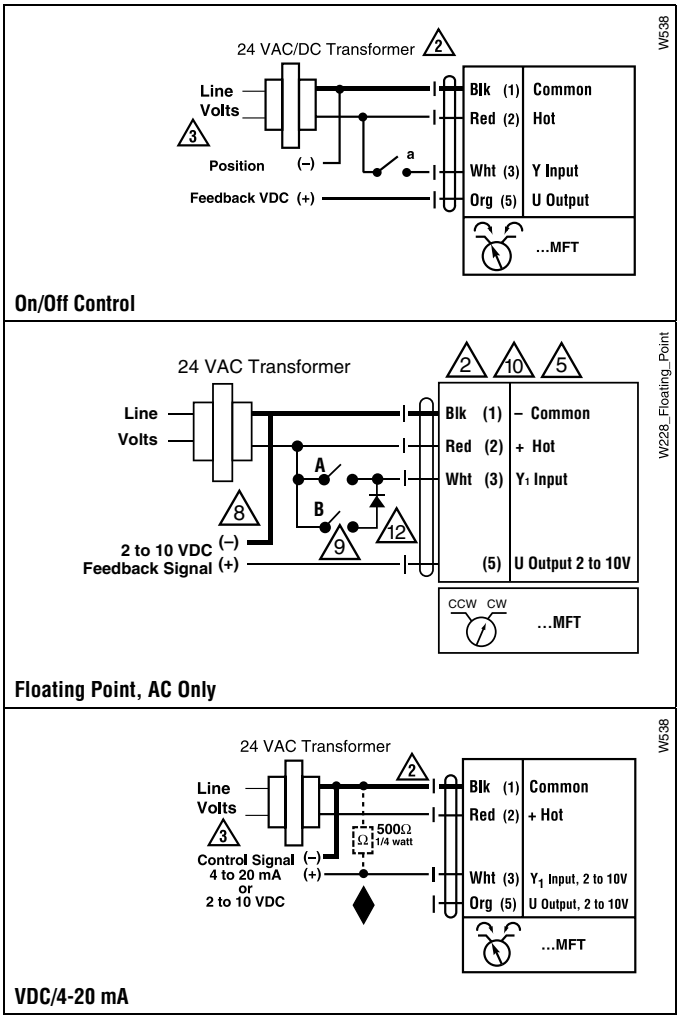
12 IN4004 or IN4007 diode. (IN4007 supplied, Belimo part number 40155).

APPLICATION NOTES

The ZG-R01 500 Ω resistor converts the 4 to 10 mA control signal to 2 to 10 VDC, up to 2 actuators may be connected in parallel.

WARNING *Live Electrical Components!*
During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.

WARNING *Mechanical Precautions*
The mechanical end stops cannot be moved or repositioned. Doing so will adversely effect the operation of the valve.
The directional switch cannot be moved. Maintain Factory Settings



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GK Actuators, On/Off, Floating Point

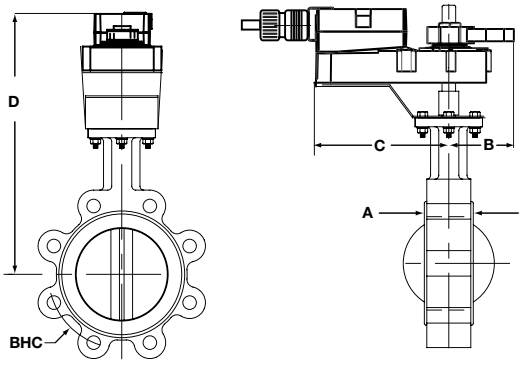
2 YEAR WARRANTY

Models

GKRB24-3-X1
GKRB24-3-5
GKB24-3-X1

Technical Data	
Power supply	24VAC ±20% 50/60Hz
Power consumption	12W (3W)
Transformer sizing	21VA (class 2 power source)
Electrical connection	18 GA plenum rated cable ½" conduit connector protected NEMA 2 (IP54) 3 ft [1m] 10 ft [3m] 16 ft [5m]
Overload protection	electronic throughout 0 to 95 rotation
Operation range Y	on/off, floating point
Input impedance	100kΩ (0.1 mA), 500Ω 1500Ω (floating point, on/off)
Feedback output U	2 to 10VDC, 0.5mA max, VDC variable
Angle of rotation	max. 95°, adjustable with mechanical stop electronically variable
Direction of rotation	reversible with switch
Fail-safe position	adjustable with dial or tool 0 to 100% in 10% increments
Position indication	reflective visual indicator (snap-on)
Manual override	external push button
Running time normal operation fail-safe	 150 seconds (default), variable 90 to 150 seconds 35 seconds
Humidity	5 to 95% RH non-condensing (EN 60730-1)
Ambient temperature	-22°F to +122°F [-30°C to +50°C]
Storage temperature	-40°F to +176°F [-40°C to +80°C]
Housing	NEMA2, IP54, UL enclosure type 2
Housing material	UL94-5VA
Agency list	cULus acc. to UL 60730-1A/-2-14 CAN/CSA E60730-1:02 CE acc. to 2004/108/EEC and 2006/95/EC
Noise level	< 45dB(A)
Servicing	maintenance free
Quality standard	ISO 9001

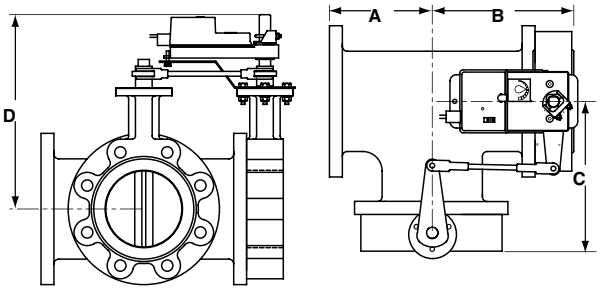
Dimensions with 2-Way Valve



AM_GM_LineRevised

Valve	Size	Dimensions (Inches) A	B	C	D(Max)	BHC	Non-Fail Safe (psi) GK
F680HD	3"	1.78	7.00	7.00	16.53	6.00	200
F6100HDU	4"	2.05	8.00	8.00	17.53	7.50	50
F6125HDU	5"	2.14	8.00	8.00	18.03	8.50	50
F650-150SHP	2"	1.75	9.00	9.00	20.03	4.75	285
F665-150SHP	2½"	1.88	9.00	9.00	20.53	5.50	285
F680-150SHP	3"	1.92	9.00	9.00	21.03	6.00	285
F6100-150SHP	4"	2.13	9.00	9.00	21.53	7.50	150
F650-300SHP	2"	1.75	9.00	9.00	20.03	5.00	150
F665-300SHP	2½"	1.88	9.00	9.00	20.53	5.88	150
F680-300SHP	3"	1.92	9.00	9.00	21.03	6.63	150
F6100-300SHP	4"	2.13	9.00	9.00	21.53	7.88	150
F6100VIC	4"	4.63	8.63	8.63	16.00	-	200

Dimensions with 3-Way Valve



Single_Butterfly

Valve	Size	Dimensions (Inches) A	B	C	D(Max)	BHC	Non-Fail Safe (psi) GK
F765HD	2½"	5.00	6.70	6.70	16.53	5.50	200
F780HDU	3"	5.50	7.20	7.20	16.78	6.00	50
F750-150SHP	2"	4.50	6.25	6.25	17.03	4.75	150
F765-150SHP	2½"	5.00	6.88	6.88	17.53	5.50	150
F780-150SHP	3"	5.50	7.42	7.42	18.03	6.00	150
F7100-150SHP	4"	6.50	8.63	8.63	18.53	7.50	150
F765VIC	2½"	3.77	6.88	6.88	15.00	-	50
F780VIC	3"	3.77	7.42	7.42	15.00	-	200
F7100VIC	4"	4.63	8.63	8.63	16.00	-	50

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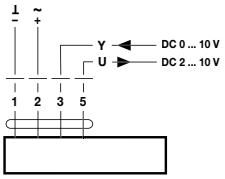
Electrical Installation

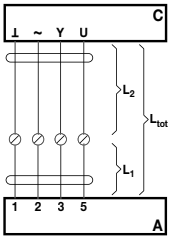
Wiring diagram

Note
- Connect via safety isolation transformer.
- Parallel connection of other actuators possible. Note performance data for supply.

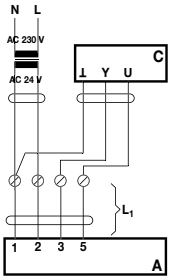


Cable lengths

Note
When several actuators are connected in parallel, the maximum cable length must be divided by the number of actuators.



Note
There are no special restrictions on installation if the supply and data cable are routed separately.



Cable colors:
1 = black
2 = red
3 = white
5 = orange

A = Actuator
C = Control unit
L_1 = Belimo connecting cable, 1 m (4 x 0.75 mm²)
L_2 = Customer cable
L_{tot} = Maximum cable length

Cross section L_2	Max. cable length $L_{tot} = L_1 + L_2$		Example for DC
⊥ / ~	AC	DC	
0.75 mm²	≤30 m	≤5 m	1 m (L_1) + 4 m (L_2)
1.00 mm²	≤40 m	≤8 m	1 m (L_1) + 7 m (L_2)
1.50 mm²	≤70 m	≤12 m	1 m (L_1) + 11 m (L_2)
2.50 mm²	≤100 m	≤20 m	1 m (L_1) + 19 m (L_2)

A = Actuator
C = Control unit
L_1 = Belimo connecting cable, 1 m (4 x 0.75 mm²)

Wiring Diagrams

INSTALLATION NOTES

1 Provide overload protection and disconnect as required.

3 Actuators may also be powered by 24 VDC.

4 Position feedback cannot be used with Triac sink controller. The actuator internal common reference is not compatible.

5 Control signal may be pulsed from either the Hot (source) or the Common (sink) 24 VAC line.

8 Contact closures A & B also can be triacs. A & B should both be closed for triac source and open for triac sink.

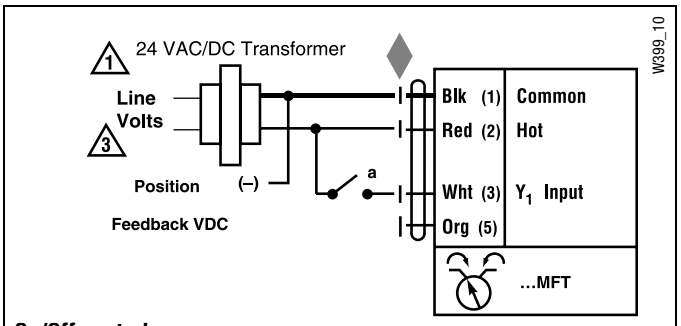
9 For triac sink the common connection from the actuator must be connected to the hot connection of the controller.

APPLICATION NOTES

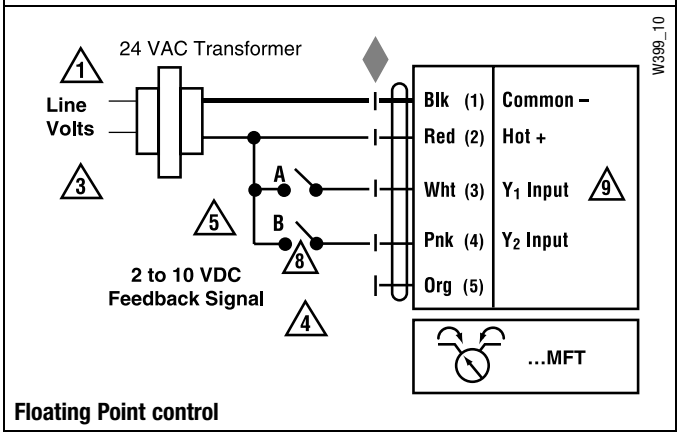
Meets UL requirements without the need of an electrical ground connection.

***WARNING** Live Electrical Components!*
During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.

NOTE: Wiring diagrams shown are for single actuator mounted solutions



On/Off control



Floating Point control

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GK Actuators, Multi-Function Technology

2 YEAR WARRANTY

MFT CE LISTED 94 05 TEMP. IND. & REG. EQUIP. c UL us BRUSHLESS dc. motor

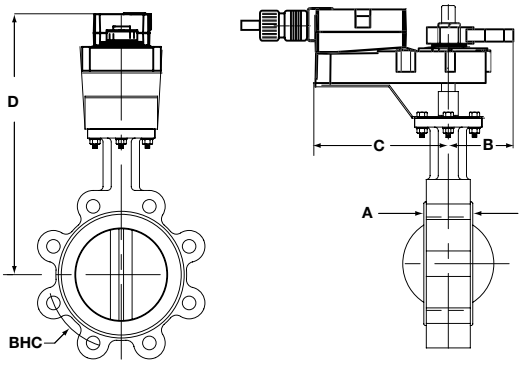
Models

GKRX24-MFT-X1
GKRB24-3-5
GKX24-MFT-X1

Technical Data	GKX24-MFT-X1
Power supply	24VAC ±20% 50/60Hz 24VDC ±10%
Power consumption	12W (3W)
Transformer sizing	21VA (class 2 power source)
Electrical connection	18 GA plenum rated cable ½" conduit connector protected NEMA 2 (IP54) 3 ft [1m] 10 ft [3m] 16 ft [5m]
Overload protection	electronic throughout 0 to 95 rotation
Operation range Y	2 to 10 VDC, 4 to 20mA (default) variable (VDC,PWM, floating point, on/off)
Input impedance	100kΩ (0.1 mA), 500Ω 1500Ω (PWM, floating point, on/off)
Feedback output U	2 to 10VDC, 0.5mA max, VDC variable
Angle of rotation	max. 95°, adjustable with mechanical stop electronically variable
Direction of rotation	reversible with ↷/↶ switch
Fail-safe position	adjustable with dial or tool 0 to 100% in 10% increments
Position indication	reflective visual indicator (snap-on)
Manual override	external push button
Running time normal operation fail-safe	 95 seconds (default), variable 90 to 150 seconds 35 seconds
Humidity	5 to 95% RH non-condensing (EN 60730-1)
Ambient temperature	-22°F to +122°F [-30°C to +50°C]
Storage temperature	-40°F to +176°F [-40°C to +80°C]
Housing	NEMA2, IP54, UL enclosure type 2
Housing material	UL94-5VA
Agency list	cULus acc. to UL 60730-1A/-2-14 CAN/CSA E60730-1:02 CE acc. to 2004/108/EEC and 2006/95/EC
Noise level	< 45dB(A)
Servicing	maintenance free
Quality standard	ISO 9001

Note: GKR Actuators are on 2-way valves
GKX Actuators are on 3-way valves

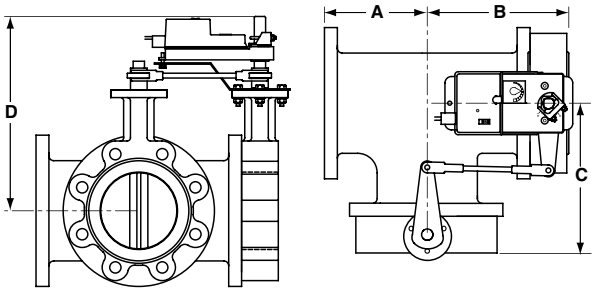
Dimensions with 2-Way Valve



AM_GM_LineRevised

Valve	Size	A	B	C	D(Max)	BHC	Non-Fail Safe (psi) GK
		Dimensions (Inches)					
F680HD	3”	1.69	9.00	9.00	21.03	6.00	200
F6100HDU	4”	1.92	9.00	9.00	21.53	7.50	50
F6125HDU	5”	2.08	9.00	9.00	22.53	8.50	50
F6150HDU	6”	2.19	9.00	9.00	22.56	9.50	50
F650-150SHP	2”	1.75	9.00	9.00	20.03	4.75	285
F665-150SHP	2½”	1.88	9.00	9.00	20.53	5.50	285
F680-150SHP	3”	1.92	9.00	9.00	21.03	6.00	285
F6100-150SHP	4”	2.13	9.00	9.00	21.53	7.50	150
F650-300SHP	2”	1.75	9.00	9.00	20.03	5.00	285
F665-300SHP	2½”	1.88	9.00	9.00	20.53	5.88	285
F680-300SHP	3”	1.92	9.00	9.00	21.03	6.63	285
F6100-300SHP	4”	2.13	9.00	9.00	21.53	7.88	150
F6100VIC	4”	4.63	8.63	8.63	16.00	-	200

Dimensions with 3-Way Valve



Single_Butterfly

Valve	Size	A	B	C	D(Max)	BHC	Non-Fail Safe (psi) GK	2*GK
		Dimensions (Inches)						
F780HDU	3”	5.50	7.20	7.20	16.78	6.00	200	
F7100HDU	4”	2.05	8.00	8.00	17.00	7.50		50
F7125HDU	5”	2.14	8.00	8.00	17.50	8.50		50
F7150HDU	6”	2.19	8.00	8.00	22.50	9.50		50
F750-150SHP	2”	4.50	6.25	6.25	17.03	4.75	150	
F765-150SHP	2½”	5.00	6.88	6.88	17.53	5.50	150	
F780-150SHP	3”	5.50	7.42	7.42	18.03	6.00	150	
F765VIC	2½”	3.77	6.88	6.88	15.00	-	50	
F780VIC	3”	3.77	7.42	7.42	15.00	-	200	
F7100VIC	4”	4.63	8.63	8.63	16.00	-	50	

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Wiring Diagrams

INSTALLATION NOTES

1 Provide overload protection and disconnect as required.

3 Actuators may also be powered by 24 VDC.

4 Position feedback cannot be used with Triac sink controller.
The actuator internal common reference is not compatible.

5 Control signal may be pulsed from either the Hot (source)
or the Common (sink) 24 VAC line.

8 Contact closures A & B also can be triacs.
A & B should both be closed for triac source and open for triac sink.

9 For triac sink the common connection from the actuator
must be connected to the hot connection of the controller.

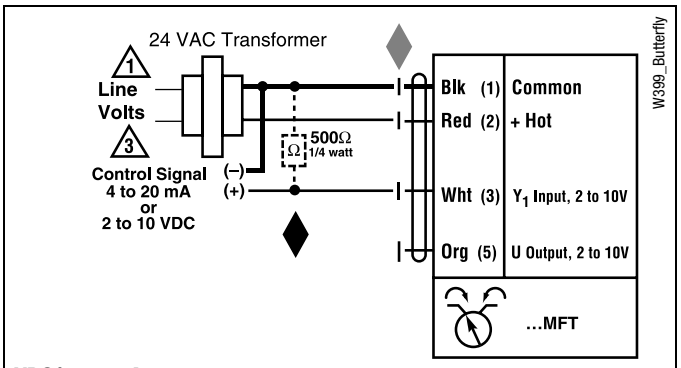
APPLICATION NOTES

◆ Meets UL requirements without the need of an electrical ground connection.

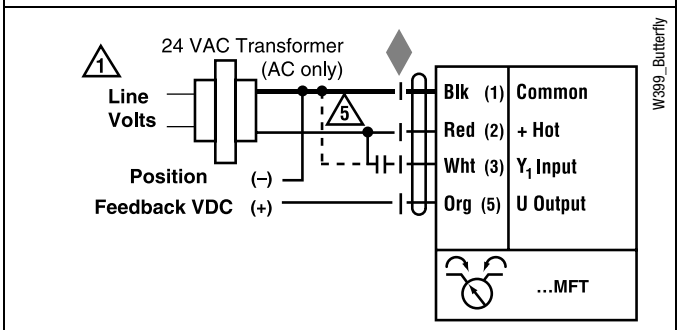
◆ The ZG-R01 500 Ω resistor may be used.

WARNING *Live Electrical Components!*
During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.

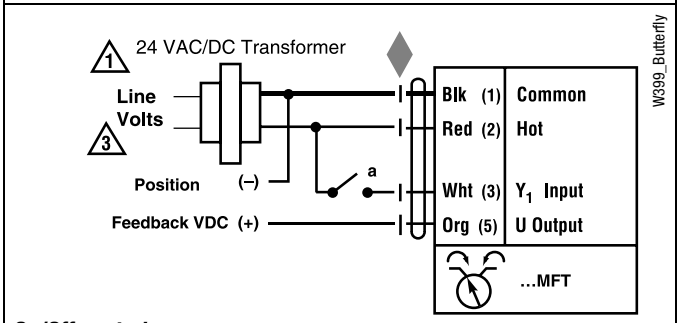
NOTE: Wiring diagrams shown are for single actuator mounted solutions



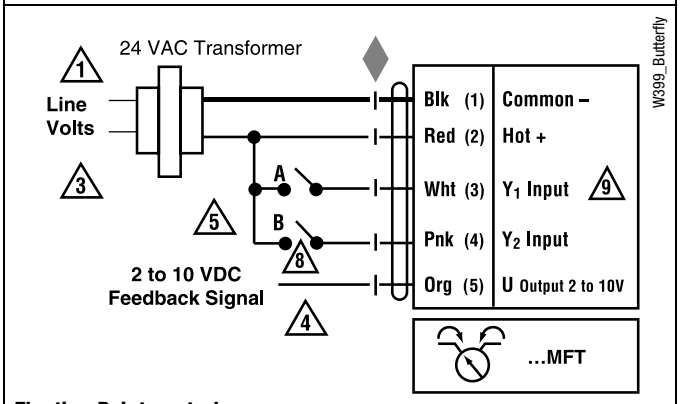
VDC/4-20 mA



PWM



On/Off control



Floating Point control

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AM/AR Series Actuators, On/Off, Floating Point

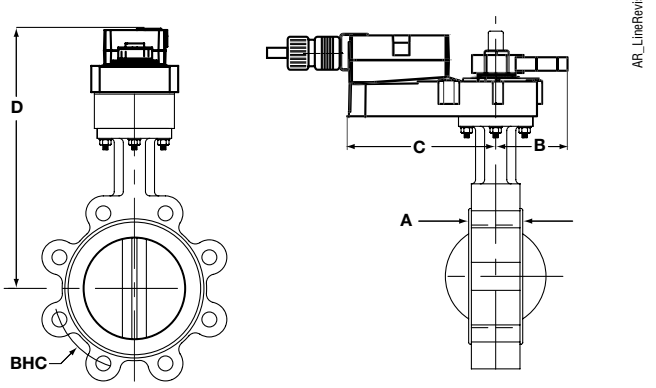
Models

AMB24-3-X1
ARB24-3-X1
ARB24-3-5

Technical Data	
Power supply	24 VAC ± 20% 50/60 Hz 24 VDC ± 10%
Power consumption running	2.0 W
holding	0.2 W
Transformer sizing	5.5 VA (class 2 power source)
Electrical connection	3 ft, 18 GA plenum rated cable ½" conduit connector
Overload protection	electronic throughout 0° to 95° rotation
Control	on/off, floating point
Input impedance	600 Ω
Angle of rotation	95°, adjustable with mechanical stop
Direction of rotation	reversible with protected ↷/↶ switch
Position indication	handle
Manual override	external push button
Running time	95 seconds
Humidity	5 to 95% RH non condensing (EN 60730-1)
Ambient temperature	-22°F to +122°F [-30°C to +50°C]
Storage temperature	-40°F to +176°F [-40°C to +80°C]
Housing	NEMA 2/IP54
Housing material	UL94-5VA
Agency listings†	cULus according to UL 60730-1A/-2-14, CAN/CSA E60730-1, CSA C22.2 No. 24-93, CE according to 89/336/EEC (and 2006/95/EC for line voltage and/or -S versions)
Noise level	<45dB(A)
Quality standard	ISO 9001

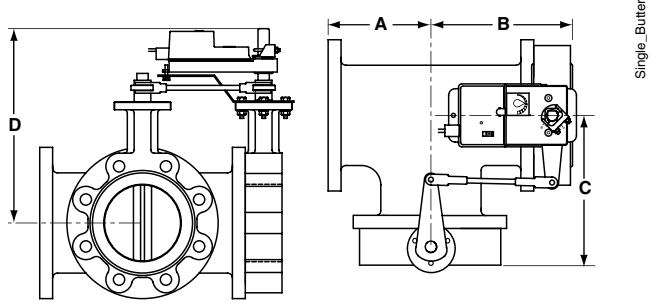
Note: AR Actuators are on 2-way valves
AM Actuators are on 3-way valves

Dimensions with 2-Way Valve



		Dimensions (Inches)					Non-Fail Safe (psi)	
Valve	Size	A	B	C	D(Max)	BHC	HD	HDU
F650HD(U)	2"	1.65	7.00	7.00	15.00	4.75	200	50
F665HD(U)	2½"	1.76	7.00	7.00	15.50	5.50	200	50
F680HDU	3"	1.78	7.00	7.00	16.00	6.00		50
F650VIC	2"	3.21	7.00	7.00	14.50	-	200	
F665VIC	2½"	3.77	7.00	7.00	14.50	-	50	

Dimensions with 3-Way Valve



		Dimensions (Inches)					Non-Fail Safe (psi)	
Valve	Size	A	B	C	D(Max)	BHC	HD	HDU
F750HD	2"	4.50	6.15	6.15	15.50	4.75	200	
F765HDU	2½"	5.00	6.76	6.76	16.00	5.50	200	50
F750VIC	2"	3.21	6.00	6.00	15.00	-		50

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Wiring Diagrams

INSTALLATION NOTES

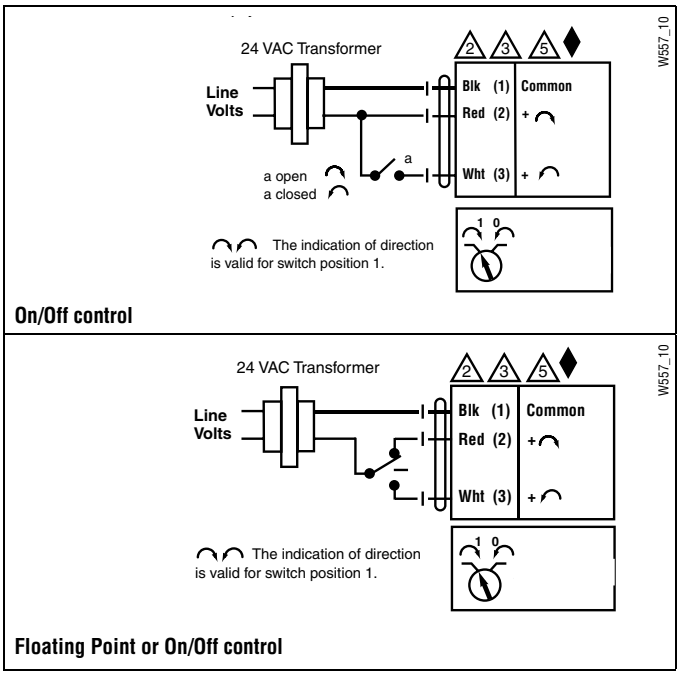
△2 ***CAUTION*** *Equipment damage!*
Actuators may be connected in parallel.
Power consumption and input impedance must be observed.

△4 Actuators may also be powered by 24 VDC.

APPLICATION NOTES

♦ Meets cULus or UL and CSA requirements without the need of an electrical ground connection.

⚠ ***WARNING*** *Live Electrical Components!*
During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.



On/Off control

Floating Point or On/Off control

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2 YEAR WARRANTY

MFT CE LISTED 94 05 TEMP. IND. & REG. EQUIP. c UL us BRUSHLESS DC. motor

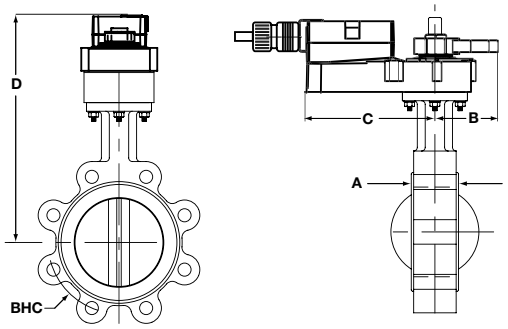
Models

AMX24-MFT-X1
ARX24-MFT-X1
ARB24-MFT-5

Technical Data	
Power supply	24 VAC ± 20% 50/60 Hz 24 VDC ± 10%
Power consumption running	4 W
Power consumption holding	1.25 W
Transformer sizing	6 VA (class 2 power source)
Electrical connection	3 ft [1m], 10 ft [3m], 16 ft [5m] 18 GA plenum rated cable ½" conduit connector
Overload protection	electronic throughout 0° to 95° rotation
Operating range Y	2 to 10 VDC, 4 to 20 mA (default) variable (VDC, PWM, floating point, on/off)
Input impedance	100k Ω (0.1 mA), 500 Ω 1500 Ω (PWM, floating point, on/off)
Feedback output U	2 to 10 VDC, 0.5 mA max VDC variable
Angle of rotation	95° electronically variable
Direction of rotation	reversible with protected ↷/↶ switch
Position indication	handle
Manual override	external push button
Running time	150 seconds (default) variable (90 to 350 secs)
Humidity	5 to 95% RH non condensing (EN 60730-1)
Ambient temperature	-22°F to +122°F [-30°C to +50°C]
Storage temperature	-40°F to +176°F [-40°C to +80°C]
Housing	NEMA 2/IP54
Housing material	UL94-5VA
Agency listings†	cULus according to UL60730-1A/-2-14, CAN/CSA E60730-1, CSA C22.2 No. 24-93, CE according to 89/336/EEC
Noise level	<45dB(A)
Quality standard	ISO 9001

† Rated impulse voltage 4kV, Control pollution degree 3, Type of action 1

Dimensions with 2-Way Valve

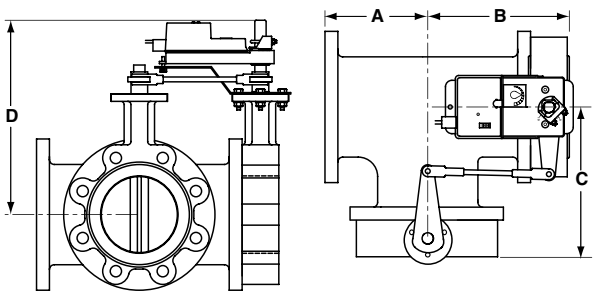


AR_LineRevised

Dimensions (Inches)

Valve	Size	A	B	C	D(Max)	BHC	
F650HD(U)	2"	1.65	3.35	7.00	14.50	4.75	Non-Spring Return (psi)
F665HD(U)	2½"	1.76	3.46	7.00	15.00	5.50	
F680HDU	3"	1.78	3.48	7.00	15.50	6.00	
F650VIC	2"	3.21	7.00	7.00	14.50	-	
F665VIC	2½"	3.77	7.00	7.00	14.50	-	

Dimensions with 3-Way Valve



Single_Butterfly

Dimensions (Inches) **Non-Fail Safe (psi)**

Valve	Size	A	B	C	D(Max)	BHC	HD	HDU
F750HD	2"	4.50	6.15	6.15	15.50	4.75	200	
F765HDU	2½"	5.00	6.76	6.76	16.00	5.50	200	50
F750VIC	2"	3.21	6.00	6.00	15.00	-		50

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Wiring Diagrams

INSTALLATION NOTES

△3 Actuators may also be powered by 24 VDC.

△4 Position feedback cannot be used with Triac sink controller.
The actuator internal common reference is not compatible.

△6 Control signal may be pulsed from either the Hot (source)
or the Common (sink) 24 VAC line.

△8 Contact closures A & B also can be triacs.
A& B should both be closed for triac source and open for triac sink.

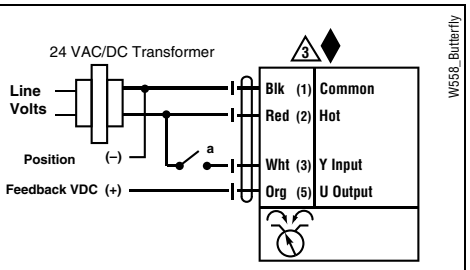
△9 For triac sink the common connection from the actuator
must be connected to the hot connection.

APPLICATION NOTES

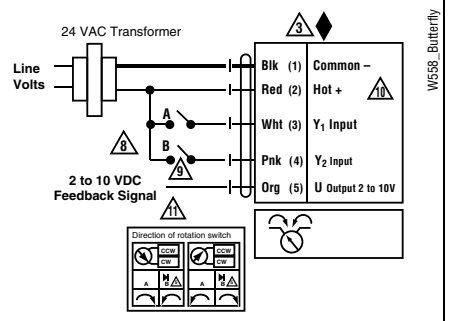
♦ The ZG-R01 500 Ω resistor converts the 4 to 10 mA control signal to 2 to 10 VDC, up to 2 actuators may be connected in parallel.

WARNING *Live Electrical Components!*

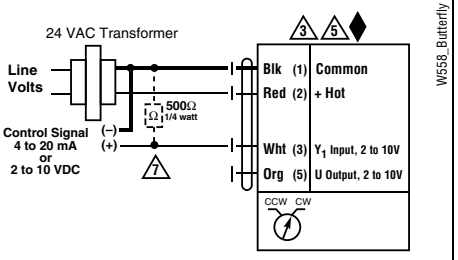
During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.



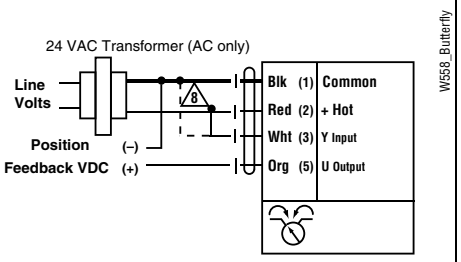
Two Position



Floating Point



VDC/4-20 mA



PWM

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BELIMO

2 YEAR WARRANTY

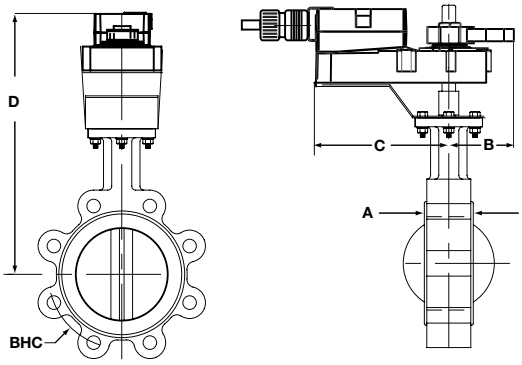
Models

GMB24-3-X1
GRB24-3-X1
GRB24-3-5
GRB24-3-7

Technical Data	
Power supply	24 VAC ± 20% 50/60 Hz 24 VDC ± 10%
Power consumption running	4.0 W
holding	2 W
Transformer sizing	6 VA (class 2 power source)
Electrical connection	3 ft, 18 GA appliance cable, 1/2" conduit connector
Overload protection	electronic throughout 0 to 95° rotation
Control signal	On/Off, Floating Point
Input impedance	600 Ω
Angle of rotation	mechanically limited to 95°
Direction of rotation	reversible with switch A/B
Position indication	0 to 1 and reversible indicator
Running time	150 sec.
Humidity	5 to 95% RH non-condensing
Ambient temperature	-22°F to 122°F [-30°C to 50°C]
Storage temperature	-40°F to 176°F [-40°C to 80°C]
Housing	NEMA 2/IP54
Housing material	UL94-5VA (flammability rating)
Agency listings	cULus according to UL60730-1A/-2-14, CAN/CSA E60730-1, CSA C22.2 No.24-93, CE according to 89/336/EEC
Noise level	max. 45 dB (A)
Servicing	maintenance free
Quality standard	ISO 9001

Note: GR Actuators are on 2-way valves
GM Actuators are on 3-way valves

Dimensions with 2-Way Valve



AM_GM_LineRevised

	Dimensions (Inches)						Non-Fail Safe (psi)	
Valve	Size	A	B	C	D(Max)	BHC	GM	2*GM
F680HD	3"	1.78	7.00	7.00	16.00	6.00	200	
F6100HD	4"	2.05	8.00	8.00	17.00	7.50		200
F6100HDU	4"	2.05	8.00	8.00	17.00	7.50	50	
F6125HDU	5"	2.14	8.00	8.00	17.50	8.50	50	
F6150HDU	6"	2.19	8.00	8.00	22.50	9.50		50
F650-150SHP	2"	1.75	9.00	9.00	19.50	4.75	285	
F665-150SHP	2½"	1.88	9.00	9.00	20.00	5.50	285	
F680-150SHP	3"	1.92	9.00	9.00	20.50	6.00	285	
F6100-150SHP	4"	2.13	9.00	9.00	21.00	7.50	150	285
F650-300SHP	2"	1.75	9.00	9.00	19.50	5.00	285	400
F665-300SHP	2½"	1.88	9.00	9.00	20.00	5.88	285	400
F680-300SHP	3"	1.92	9.00	9.00	20.50	6.63	285	400
F6100-300SHP	4"	2.13	9.00	9.00	21.00	7.88	150	285
F665VIC	2½"	3.77	7.00	7.00	15.50	-	200	
F680VIC	3"	3.77	7.00	8.00	15.50	-	200	
F6100VIC	4"	4.63	8.00	8.00	16.00	-		200

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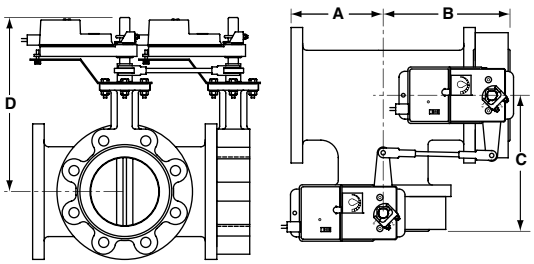
Dimensions with 3-Way Valve



		Dimensions (Inches)					Non-Fail Safe (psi)	
Valve	Size	A	B	C	D(Max)	BHC	GM	2*GM
F765HD	2½"	5.00	6.70	6.70	16.00	5.50	200	
F780HD	3"	5.50	7.20	7.20	16.25	6.00		200
F780HDU	3"	5.50	7.20	7.20	16.25	6.00	50	
F7100HDU	4"	6.50	8.45	8.45	17.00	7.50		50
F7125HDU	5"	7.50	9.60	9.60	17.50	8.50		50
F7150HDU	6"	8.00	10.08	10.08	18.00	9.50		50
F750-150SHP	2"	4.50	6.25	6.25	16.50	4.75	150	285
F765-150SHP	2½"	5.00	6.88	6.88	17.00	5.50	150	285
F780-150SHP	3"	5.50	7.42	7.42	17.50	6.00	150	285
F7100-150SHP	4"	6.50	8.63	8.63	18.00	7.50	150	
F750-300SHP	2"	5.00	6.75	6.75	15.50	5.00		285
F765-300SHP	2½"	5.50	7.38	7.38	16.00	5.88		285
F780-300SHP	3"	6.00	7.92	7.92	16.25	6.63		285
F7100-300SHP	4"	7.00	9.13	9.13	18.00	7.88		150
F750VIC	2"	5.00	6.70	6.70	15.50	-	50	
F765VIC	2½"	5.25	7.25	7.25	15.50	-		200
F780VIC	3"	6.00	7.25	7.25	16.00	-		50

Wiring Diagrams

INSTALLATION NOTES

2 **CAUTION** *Equipment damage!*
Actuators may be connected in parallel.
Power consumption and input impedance must be observed.

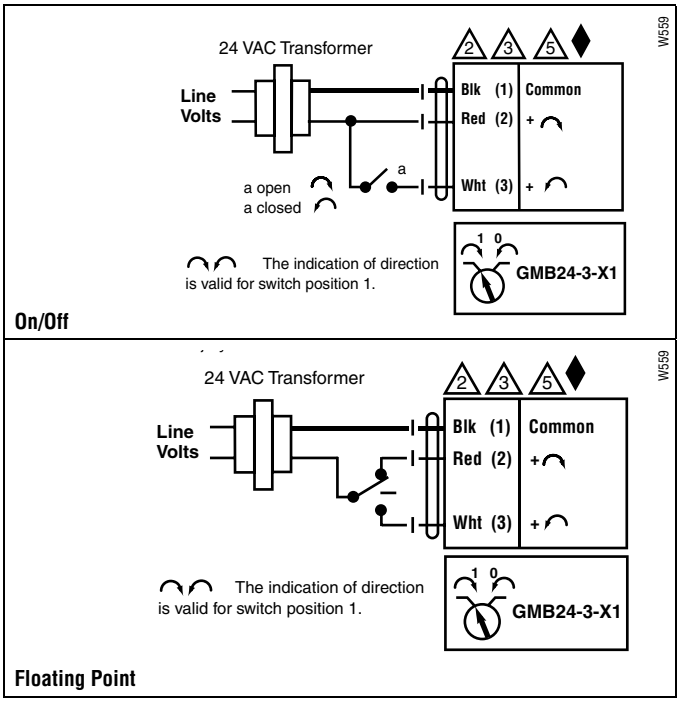
3 Actuators may also be powered by 24 VDC.

5 Actuators with plenum rated cable do not have numbers on wires; use color codes instead. Actuators with appliance cables are numbered.

APPLICATION NOTES

Meets cULus or UL and CSA requirements without the need of an electrical ground connection.

WARNING *Live Electrical Components!*
During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.



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BELIMO

2 YEAR WARRANTY

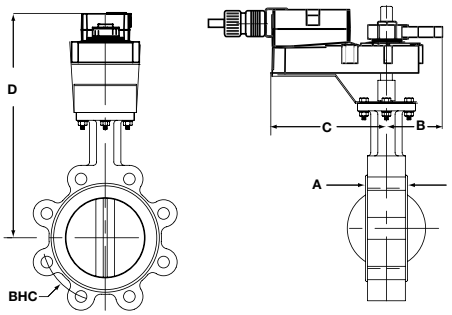
MFT CE LISTED 94 05 TEMP. IND. & REG. EQUIP. c UL us BRUSHLESS dc. motor

Models

GMX24-MFT-X1
GRX24-MFT-X1
GRB24-MFT-5
GRB24-MFT-7

Technical Data		
Power supply		24 VAC ± 20% 50/60 Hz 24 VDC ± 10%
Power consumption	running	4.5 W
	holding	2 W
Transformer sizing		7 VA (class 2 power source)
Electrical connection		3 ft, 18 GA appliance cable, 1/2" conduit connector
Overload protection		electronic throughout 0 to 95° rotation
Control signal		2 to 10 VDC, 4 to 20 mA (with 500 Ω, 1/4 W resistor) ZG-R01
Input impedance		100 k Ω for 2 to 10 VDC (0.1 mA) 500 Ω for 4 to 20 mA 750 Ω for PWM 1500 Ω for on/off and floating point
Angle of rotation		mechanically limited to 95°
Direction of rotation		reversible with switch A/B
Position indication		0 to 1 and reversible indicator
Running time		150 seconds
Humidity		5 to 95% RH non-condensing
Ambient temperature		-22°F to 122°F [-30°C to 50°C]
Storage temperature		-40°F to 176°F [-40°C to 80°C]
Housing		NEMA 2/IP54
Housing material		UL94-5VA (flammability rating)
Agency listings		cULus according to UL60730-1A/-2-14, CAN/CSA E60730-1, CSA C22.2 No.24-93, CE according to 89/336/EEC
Noise level		max. 45 dB(A)
Servicing		maintenance free
Quality standard		ISO 9001

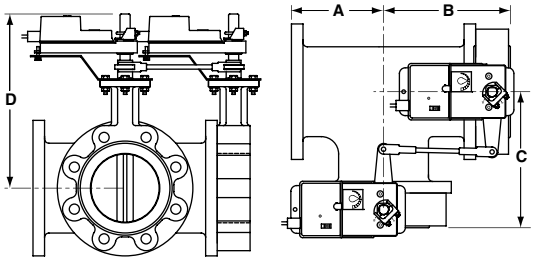
Dimensions with 2-Way Valve



AM_GM_LineRevised

	Dimensions (Inches)						Non-Fail Safe (psi)	
Valve	Size	A	B	C	D(Max)	BHC	GM	2*GM
F680HD	3"	1.69	9.00	9.00	20.50	6.00	200	
F6100HD	4"	1.92	9.00	9.00	21.00	7.50		200
F6100HDU	4"	1.92	9.00	9.00	21.00	7.50	50	
F6125HDU	5"	2.08	9.00	9.00	22.00	8.50	50	
F6150HDU	6"	2.08	9.00	9.00	22.50	9.50		50
F650-150SHP	2"	1.75	9.00	9.00	19.50	4.75	285	
F665-150SHP	2½"	1.88	9.00	9.00	20.00	5.50	285	
F680-150SHP	3"	1.92	9.00	9.00	20.50	6.00	285	
F6100-150SHP	4"	2.13	9.00	9.00	21.00	7.50	150	285
F650-300SHP	2"	1.75	9.00	9.00	19.50	5.00	285	400
F665-300SHP	2½"	1.88	9.00	9.00	20.00	5.88	285	400
F680-300SHP	3"	1.92	9.00	9.00	20.50	6.63	285	400
F6100-300SHP	4"	2.13	9.00	9.00	21.00	7.88	150	285
F665VIC	2½"	3.77	7.00	7.00	15.50	-	200	
F680VIC	3"	3.77	7.00	8.00	15.50	-	200	
F6100VIC	4"	4.63	8.00	8.00	16.00	-		200

Dimensions with 3-Way Valve



D101

	Dimensions (Inches)						Non-Fail Safe (psi)	
Valve	Size	A	B	C	D(Max)	BHC	GM	2*GM
F765HD	2½"	5.00	6.70	6.70	16.00	5.50	200	
F780HD	3"	5.50	7.20	7.20	16.25	6.00		200
F780HDU	3"	5.50	7.20	7.20	16.25	6.00	50	
F7100HD	4"	6.50	8.45	8.45	17.00	7.50		200
F7100HDU	4"	6.50	8.45	8.45	17.00	7.50		50
F7125HDU	5"	7.50	9.60	9.60	17.50	8.50		50
F7150HDU	6"	8.00	10.08	10.08	18.00	9.50		50
F750-150SHP	2"	4.50	6.25	6.25	16.50	4.75	150	285
F765-150SHP	2½"	5.00	6.88	6.88	17.00	5.50	150	285
F780-150SHP	3"	5.50	7.42	7.42	17.50	6.00	150	285
F750-300SHP	2"	5.00	6.75	6.75	15.50	5.00		285
F765-300SHP	2½"	5.50	7.38	7.38	16.00	5.88		285
F780-300SHP	3"	6.00	7.92	7.92	16.25	6.63		285
F7100-300SHP	4"	7.00	9.13	9.13	18.00	7.88		150
F750VIC	2"	5.00	6.70	6.70	15.50	-	50	
F765VIC	2½"	5.25	7.25	7.25	15.50	-		200
F780VIC	3"	6.00	7.25	7.25	16.00	-		50

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Wiring Diagrams

INSTALLATION NOTES

△3 Actuators may also be powered by 24 VDC.

△5 Actuators with plenum rated cable do not have numbers on wires; use color coded instead. Actuators with appliance rated cable use numbers.

△8 Control signal may be pulsed from either the Hot (Source) or Common (Sink) 24 VAC line.

△10 For triac sink the Common connection from the actuator must be connected to the Hot connection of the controller.

APPLICATION NOTES

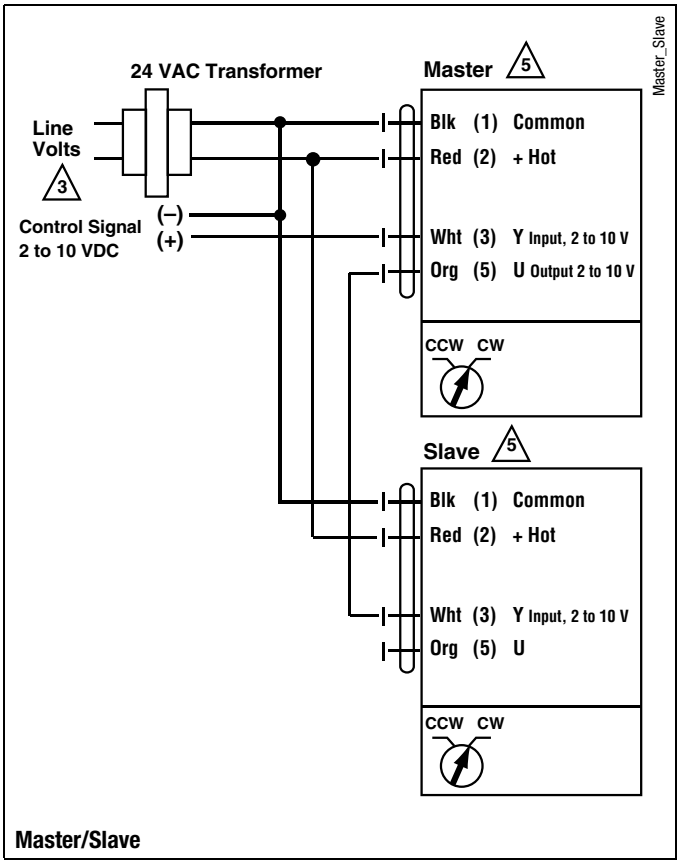
♦ Meets cULus or UL and CSA requirements without the need of an electrical ground connection.

△9 Contact closures A & B also can be triacs. A & B should both be closed for triac source and open for triac sink.

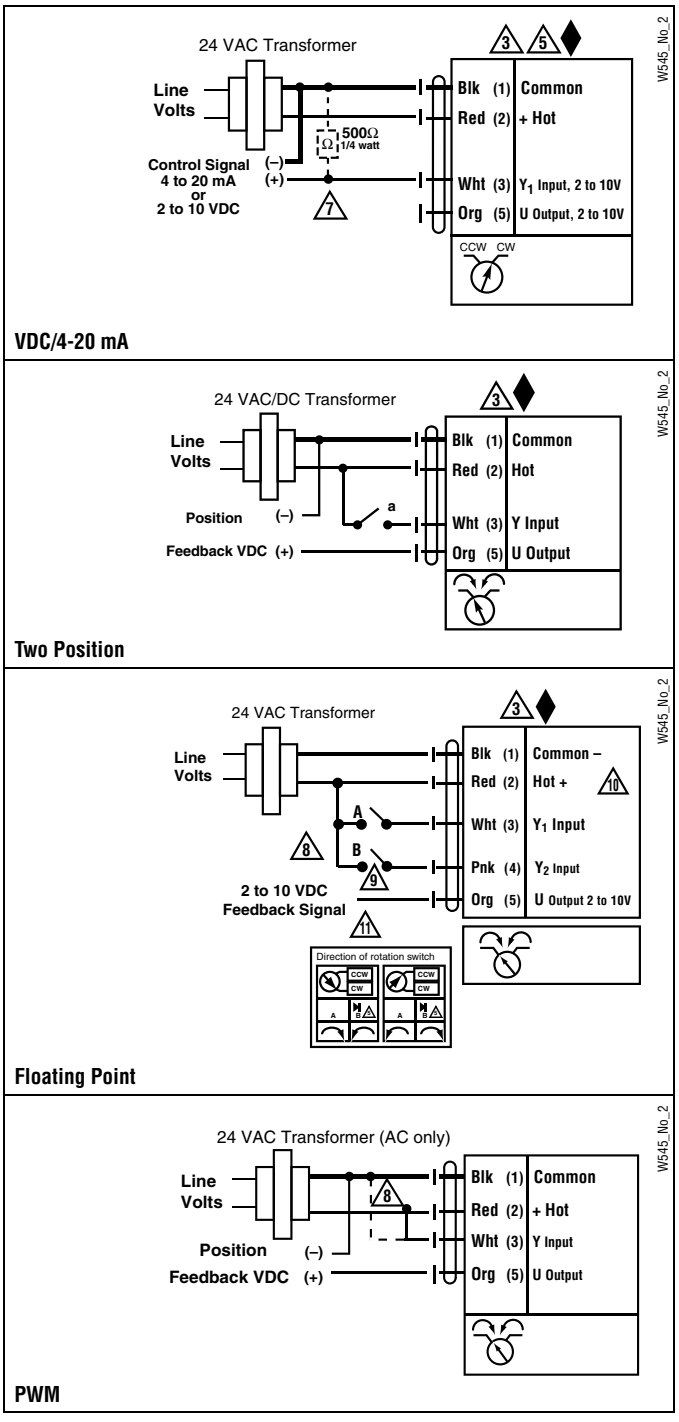
△11 Position feedback cannot be used with a Triac sink controller. The actuator internal common reference is not compatible.

⚠ *WARNING* *Live Electrical Components!*

During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.



Master/Slave



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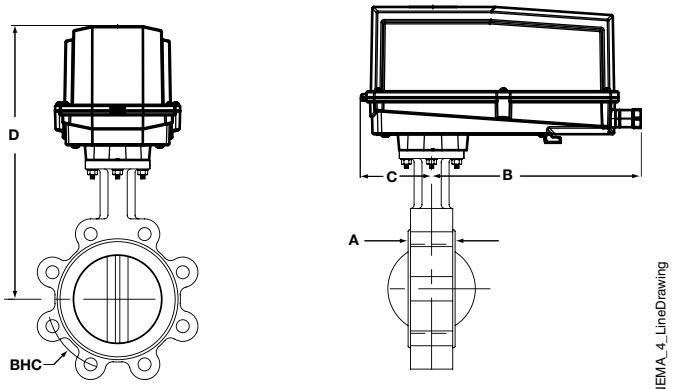
GRCX(B)24-3-T N4(H) NEMA 4 Actuators, On/Off, Floating Point

Models

GRCX24-3-T N4 w/terminal block
GRCB24-3-T N4H w/heater

Technical Data	
Control	on/off, floating point
Power supply	24 VAC ± 20% 50/60 Hz 24 VDC ± 10%
Power consumption running	8W / heater 29W
holding	2.5W
Transformer sizing	11 VA (class 2 power source) / heater 26 VA
Electrical connection	screw terminal (for 22 to 12 AWG wire)
Overload protection	electronic throughout 0° to 90° rotation
Input impedance	1000 Ω at control input
Angle of rotation	90°, adjustable with mechanical stop
Position indication	visual pointer
Manual override	internal push button (UL Type 4)
Running time	35 seconds (default)
Humidity	5 to 100% RH (UL Type 4)
Ambient temperature	-22°F to 122°F [-30°C to 50°C]
Storage temperature	-40°F to 176°F [-40°C to 80°C]
Housing type	UL Type 4/NEMA 4/IP66
Housing material	Polycarbonate
Agency listings	cULus according to UL 60730-1A, UL 60730-2-14 and CAN/CSA E60730-1; Certified to IEC/EN 60730-1 and IEC/EN 60730-2-14
EMC	CE according to 2004/108/EC
Quality standard	ISO 9001

Dimensions with 2-Way Valve



GR_NEMA_4_LineDrawing

Valve Body	Valve Nominal Size Inches	DN [mm]	Dimensions (Inches [mm]) A	B	C	D	FLG
F650HD/HDU	2"	50	1.65 [41.9]	10.49 [266]	3.62 [92]	18.94 [481]	F05
F665HD/HDU	2.5"	65	1.76 [44.7]	10.49 [266]	3.62 [92]	19.49 [495]	F05
F680HD/HDU	3"	80	1.78 [45.2]	10.49 [266]	3.62 [92]	19.73 [501]	F05
F6100HDU	4"	100	2.05 [52.1]	10.49 [266]	3.62 [92]	20.47 [520]	F07
F6125HDU	5"	125	2.14 [54.4]	10.49 [266]	3.62 [92]	20.99 [533]	F07

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Wiring Diagrams

INSTALLATION NOTES

△2 ***CAUTION** Equipment damage!*
Actuators may be connected in parallel.
Power consumption and input impedance must be observed.

△4 Actuators may also be powered by 24 VDC.

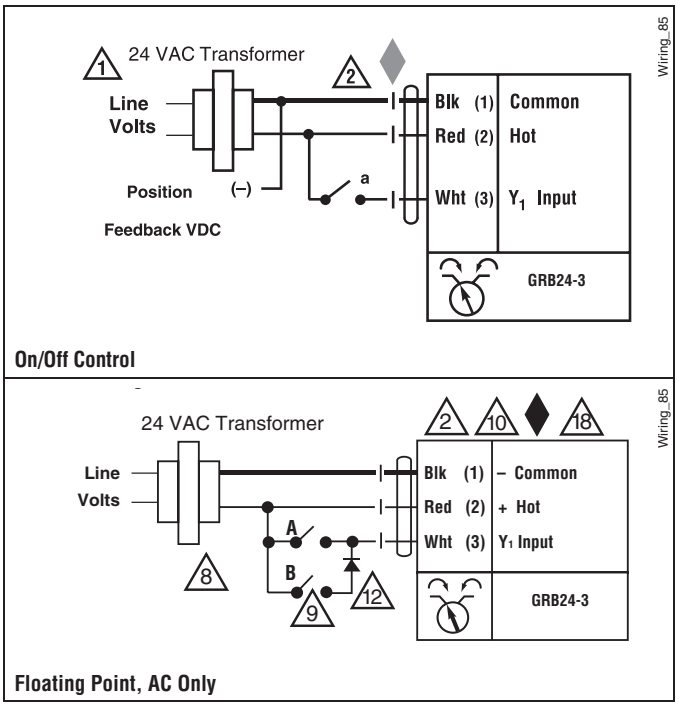
△5 Actuators with plenum rated cable do not have numbers on wires; use color codes instead. Actuators with appliance cables are numbered.

APPLICATION NOTES

◆ Meets cULus or UL and CSA requirements without the need of an electrical ground connection. Use suitable flexible metallic conduit or its equivalent with the conduit fitting.

⚠ ***WARNING** Live Electrical Components!*
During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.

⚠ ***WARNING** Mechanical Precautions*
The mechanical end stops cannot be moved or repositioned. Doing so will adversely effect the operation of the valve.
The directional switch cannot be moved. Maintain Factory Settings



On/Off Control

Floating Point, AC Only

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GRX(B)24-MFT-T N4(H) NEMA 4 Actuators, Multi-Function Technology

MFT

2 YEAR WARRANTY

CE LISTED 94 D5 TEMP.IND. & REG.EQUIP. c UL us

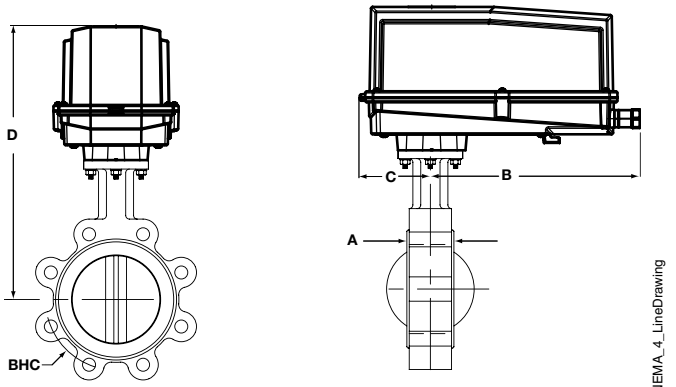
BRUSHLESS D.C. MOTOR

Models

GRX24-MFT-T N4 w/terminal block
GRB24-MFT-T N4H w/heater

Technical Data	
Control	2 to 10 VDC, 4 to 20 mA (default) variable (VDC, floating point, on/off)
Power supply	24 VAC ± 20% 50/60 Hz 24 VDC ± 10%
Power consumption running	8 W / heater 29W
holding	2.5 W
Transformer sizing	11 VA (class 2 power source) / heater 24 VA
Electrical connection	screw terminal (for 22 to 12 AWG wire)
Overload protection	electronic throughout 0° to 90° rotation
Input impedance	100 kΩ for 2 to 10 VDC (0.1 mA) 500 Ω for 4 to 20 mA 1000 Ω for floating point and on-off control
Angle of rotation	90°, adjustable with mechanical stop electronically variable
Position indication	visual pointer
Manual override	internal push button (UL Type 4)
Running time	150 seconds (default) variable (75 to 290 seconds)
Humidity	5 to 100% RH (UL Type 4)
Ambient temperature	-22°F to 122°F [-30°C to 50°C]
Storage temperature	-40°F to 176°F [-40°C to 80°C]
Housing type	UL Type 4/NEMA 4/IP66
Housing material	Polycarbonate
Agency listings	cULus according to UL 60730-1A, UL 60730-2-14 and CAN/CSA E60730-1; Certified to IEC/EN 60730-1 and IEC/EN 60730-2-14
EMC	CE according to 2004/108/EC
Quality standard	ISO 9001

Dimensions with 2-Way Valve



Valve Nominal Size			Dimensions (Inches [mm])				
Valve Body	Inches	DN [mm]	A	B	C	D	FLG
F650HD/HDU	2"	50	1.65 [41.9]	10.49 [266]	3.62 [92]	18.94 [481]	F05
F665HD/HDU	2.5"	65	1.76 [44.7]	10.49 [266]	3.62 [92]	19.49 [495]	F05
F680HD/HDU	3"	80	1.78 [45.2]	10.49 [266]	3.62 [92]	19.73 [501]	F05
F6100HDU	4"	100	2.05 [52.1]	10.49 [266]	3.62 [92]	20.47 [520]	F07
F6125HDU	5"	125	2.14 [54.4]	10.49 [266]	3.62 [92]	20.99 [533]	F07

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Wiring Diagrams

INSTALLATION NOTES

△2 ***CAUTION** Equipment damage!*
Actuators may be connected in parallel.
Power consumption and input impedance must be observed.

△3 Actuators may also be powered by 24 VDC.

△5 Actuators with plenum rated cable do not have numbers on wires; use color codes instead. Actuators with appliance cables are numbered.

△8 Control signal may be pulsed from either the Hot (source) or the Common (sink) 24 VAC line.

△9 Contact closures A & B also can be triacs.
A& B should both be closed for triac source and open for triac sink.

△10 For triac sink the Common connection from the actuator must be connected to the Hot connection of the controller. Position feedback cannot be used with a Triac sink controller. The actuator internal common reference is not compatible.

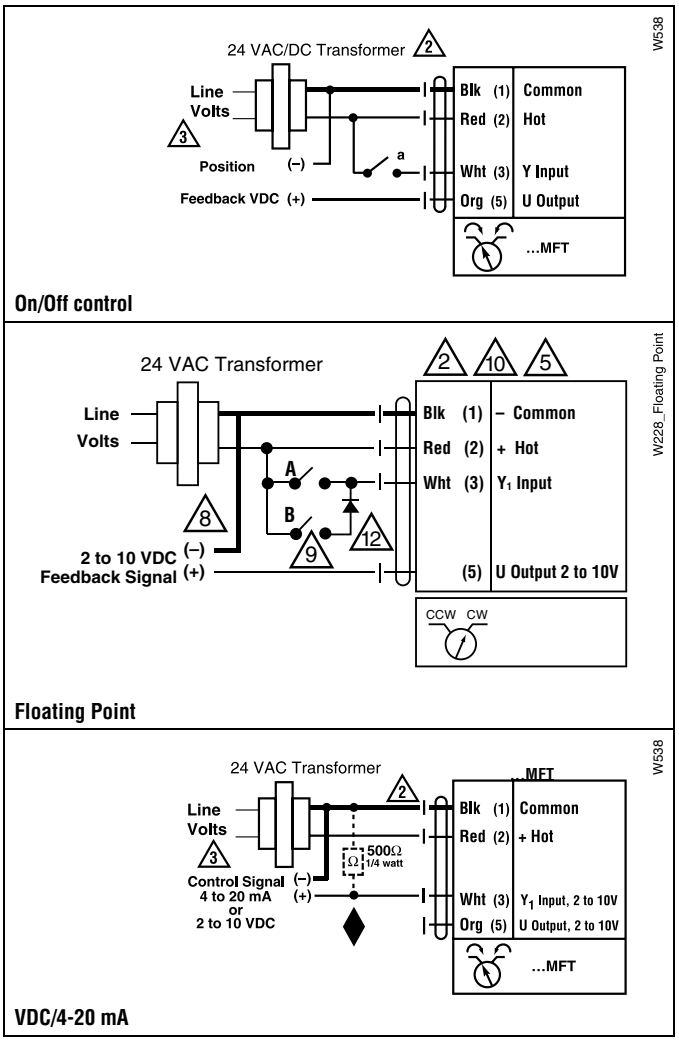
△12 IN4004 or IN4007 diode. (IN4007 supplied, Belimo part number 40155).

APPLICATION NOTES

♦ The ZG-R01 500 Ω resistor converts the 4 to 20 mA control signal to 2 to 10 VDC, up to 2 actuators may be connected in parallel.

⚠ ***WARNING** Live Electrical Components!*
During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.

⚠ ***WARNING** Mechanical Precautions*
The mechanical end stops cannot be moved or repositioned. Doing so will adversely effect the operation of the valve.
The directional switch cannot be moved. Maintain Factory Settings



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GMCX(B)24-3-T-X1 N4(H) NEMA 4 Actuators, On/Off, Floating Point

2 YEAR WARRANTY

LISTED 94 D5 TEMP. IND. & REG. EQUIP. c UL us

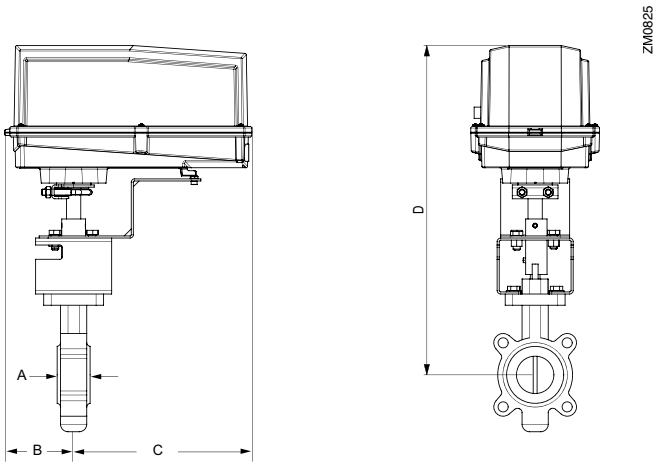
BRUSHLESS d.c. motor

Models

GMCX24-3-T-X1 N4 w/terminal block
GMCB24-3-T-X1 N4H w/heater

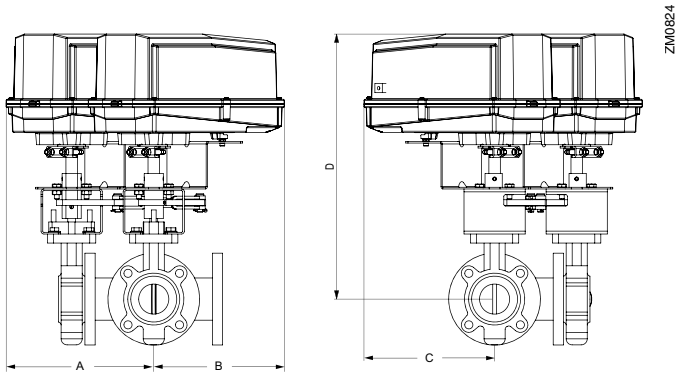
Technical Data	
Control	on/off, floating point
Power supply	24 VAC ± 20% 50/60 Hz 24 VDC ± 10%
Power consumption running	8W / heater 28W
holding	2.5W
Transformer sizing	11 VA (class 2 power source) / heater 26 VA
Electrical connection	screw terminal (for 22 to 12 AWG wire)
Overload protection	electronic throughout 0° to 95° rotation
Input impedance	1000 Ω at control input
Angle of rotation	95°, adjustable with mechanical stop electronically variable
Direction of rotation	reversible with ↷/↶ switch
Position indication	visual pointer
Manual override	internal push button (UL Type 4)
Running time	35 seconds (default)
Humidity	5 to 100% RH (UL Type 4)
Ambient temperature	-22°F to 122°F [-30°C to 50°C]
Storage temperature	-40°F to 176°F [-40°C to 80°C]
Housing type	UL Type 4/NEMA 4/IP66
Housing material	Polycarbonate
Agency listings	cULus according to UL 60730-1A, UL 60730-2-14 and CAN/CSA E60730-1; Certified to IEC/EN 60730-1 and IEC/EN 60730-2-14
EMC	CE according to 2004/108/EC
Quality standard	ISO 9001

Dimensions with 2-Way Valve



Valve Nominal Size			Dimensions (Inches [mm])			
Valve Body	Inches	DN [mm]	A	B	C	D
F650-150SHP	2"	50	1.75 [44.5]	3.62 [92]	10.49 [266]	17.32 [440]
F665-150SHP	2.5"	65	1.88 [47.8]	3.62 [92]	10.49 [266]	17.32 [440]
F680-150SHP	3"	80	1.92 [48.8]	3.62 [92]	10.49 [266]	18.07 [459]
F6100-150SHP	4"	100	2.13 [54.1]	3.62 [92]	10.49 [266]	18.80 [478]
F650-300SHP	2"	50	1.75 [44.5]	3.62 [92]	10.49 [266]	17.32 [440]
F665-300SHP	2.5"	65	1.88 [47.8]	3.62 [92]	10.49 [266]	17.32 [440]
F680-300SHP	3"	80	1.92 [48.8]	3.62 [92]	10.49 [266]	18.07 [459]
F6100-300SHP	4"	100	2.13 [54.1]	3.62 [92]	10.49 [266]	18.80 [478]

Dimensions with 3-Way Valve



Valve Nominal Size			Dimensions (Inches [mm])			
Valve Body	Inches	DN [mm]	A	B	C	D
F750-150SHP	2"	50	1.75 [44.5]	3.62 [92]	10.49 [266]	17.32 [440]
F765-150SHP	2.5"	65	1.88 [47.8]	3.62 [92]	10.49 [266]	17.32 [440]
F780-150SHP	3"	80	1.92 [48.8]	3.62 [92]	10.49 [266]	18.07 [459]
F7100-150SHP	4"	100	2.13 [54.1]	3.62 [92]	10.49 [266]	18.80 [478]
F750-300SHP	2"	50	1.75 [44.5]	3.62 [92]	10.49 [266]	17.32 [440]
F765-300SHP	2.5"	65	1.88 [47.8]	3.62 [92]	10.49 [266]	17.32 [440]
F780-300SHP	3"	80	1.92 [48.8]	3.62 [92]	10.49 [266]	18.07 [459]
F7100-300SHP	4"	100	2.13 [54.1]	3.62 [92]	10.49 [266]	18.80 [478]

Note: Most F7 versions use dual actuators.

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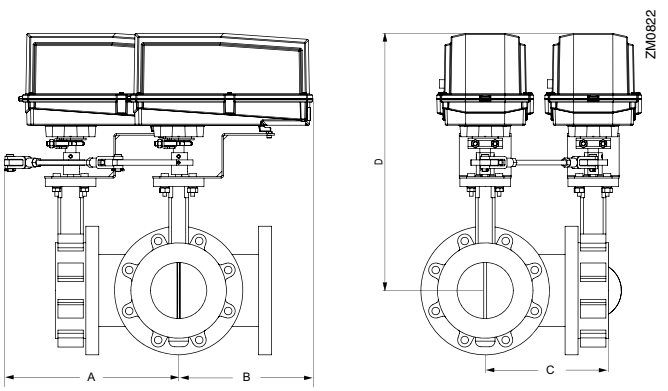
Dimensions with 3-Way Valve



Valve Body	Valve Nominal Size Inches	DN [mm]	Dimensions (Inches [mm]) A	B	C	D	FLG
F750HD/HDU	2"	50	1.65 [41.9]	10.49 [266]	3.62 [92]	18.94 [481]	F05
F765HD/HDU	2.5"	65	1.76 [44.7]	10.49 [266]	3.62 [92]	19.49 [495]	F05
F780HD/HDU	3"	80	1.78 [45.2]	10.49 [266]	3.62 [92]	19.73 [501]	F05
F7100HDU	4"	100	2.05 [52.1]	10.49 [266]	3.62 [92]	20.47 [520]	F07
F7125HDU	5"	125	2.14 [54.4]	10.49 [266]	3.62 [92]	20.99 [533]	F07
F7150HDU	6"	150	2.19 [55.6]	10.49 [266]	3.62 [92]	21.53 [547]	F07

Note: Most F7 versions use 2 actuators.

Wiring Diagrams

INSTALLATION NOTES

△2 ***CAUTION** Equipment damage!*
Actuators may be connected in parallel.
Power consumption and input impedance must be observed.

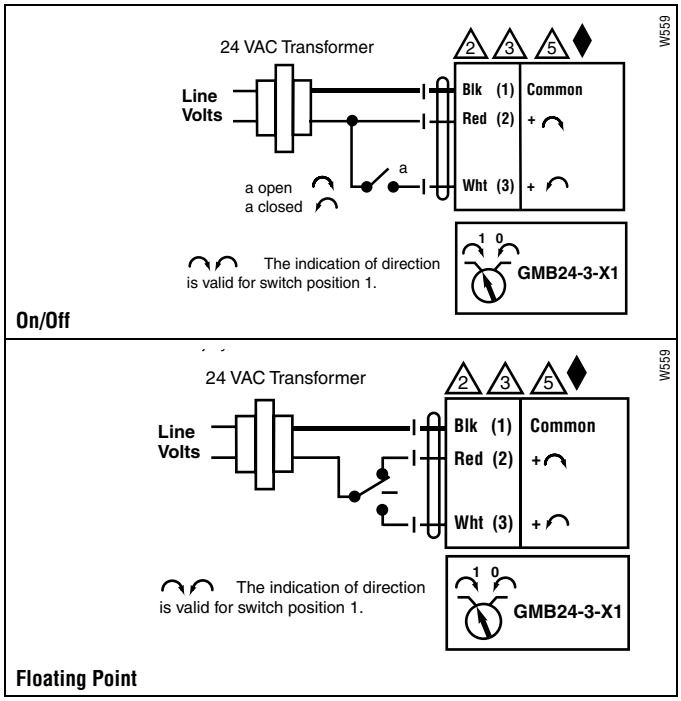
△3 Actuators may also be powered by 24 VDC.

△5 Actuators with plenum rated cable do not have numbers on wires; use color codes instead. Actuators with appliance cables are numbered.

APPLICATION NOTES

♦ Meets cULus or UL and CSA requirements without the need of an electrical ground connection.

***WARNING** Live Electrical Components!*
During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.



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GMX(B)24-MFT-T N4(H) NEMA 4 Actuators, Multi-Function Technology

MFT

2 YEAR WARRANTY

LISTED 94 D5 TEMP. IND. & REG. EQUIP. c UL us

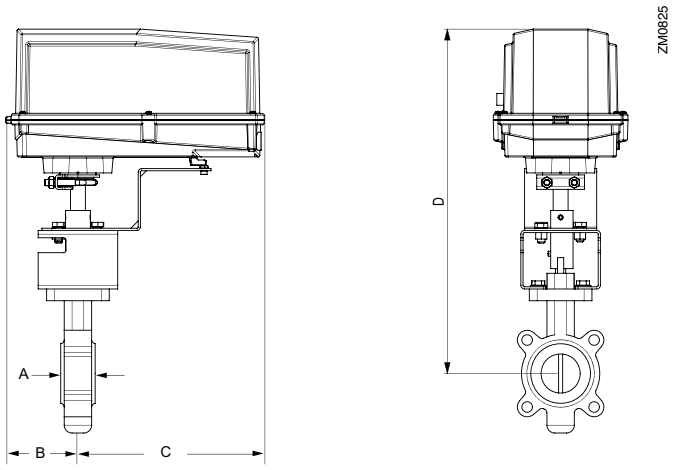
BRUSHLESS d.c. motor

Models

GMX24-MFT-T-X1 N4 w/terminal block
GMB24-MFT-T-X1 N4H w/heater

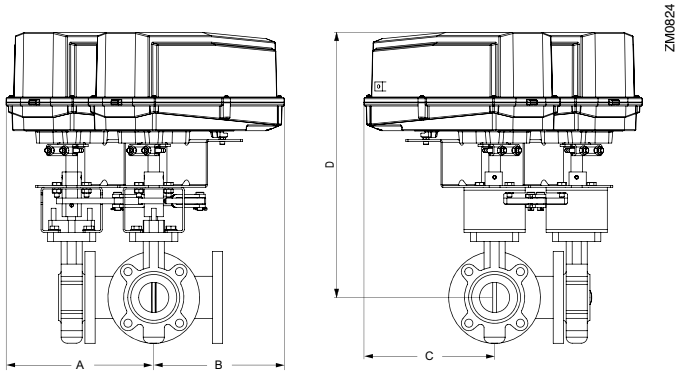
Technical Data	
Control	2 to 10 VDC, 4 to 20 mA (default) variable (VDC, floating point, on/off)
Power supply	24 VAC ± 20% 50/60 Hz 24 VDC ± 10%
Power consumption running	8 W / heater 29W
holding	2.5 W
Transformer sizing	11 VA (class 2 power source) / heater 26 VA
Electrical connection	screw terminal (for 22 to 12 AWG wire)
Overload protection	electronic throughout 0° to 95° rotation
Input impedance	100 kΩ for 2 to 10 VDC (0.1 mA) 500 Ω for 4 to 20 mA 1000 Ω for floating point and on-off control
Angle of rotation	95°, adjustable with mechanical stop electronically variable
Direction of rotation	reversible with ↷/↶ switch
Position indication	visual pointer
Manual override	internal push button (UL Type 4)
Running time	150 seconds (default) variable (75 to 290 seconds)
Humidity	5 to 100% RH (UL Type 4)
Ambient temperature	-22°F to 122°F [-30°C to 50°C]
Storage temperature	-40°F to 176°F [-40°C to 80°C]
Housing type	UL Type 4/NEMA 4/IP66
Housing material	Polycarbonate
Agency listings	cULus according to UL 60730-1A, UL 60730-2-14 and CAN/CSA E60730-1; Certified to IEC/EN 60730-1 and IEC/EN 60730-2-14
EMC	CE according to 2004/108/EC
Quality standard	ISO 9001

Dimensions with 2-Way Valve



Valve Nominal Size			Dimensions (Inches [mm])			
Valve Body	Inches	DN [mm]	A	B	C	D
F650-150SHP	2"	50	1.75 [44.5]	3.62 [92]	10.49 [266]	17.32 [440]
F665-150SHP	2.5"	65	1.88 [47.8]	3.62 [92]	10.49 [266]	17.32 [440]
F680-150SHP	3"	80	1.92 [48.8]	3.62 [92]	10.49 [266]	18.07 [459]
F6100-150SHP	4"	100	2.13 [54.1]	3.62 [92]	10.49 [266]	18.80 [478]
F650-300SHP	2"	50	1.75 [44.5]	3.62 [92]	10.49 [266]	17.32 [440]
F665-300SHP	2.5"	65	1.88 [47.8]	3.62 [92]	10.49 [266]	17.32 [440]
F680-300SHP	3"	80	1.92 [48.8]	3.62 [92]	10.49 [266]	18.07 [459]
F6100-300SHP	4"	100	2.13 [54.1]	3.62 [92]	10.49 [266]	18.80 [478]

Dimensions with 3-Way Valve



Valve Nominal Size			Dimensions (Inches [mm])			
Valve Body	Inches	DN [mm]	A	B	C	D
F750-150SHP	2"	50	11.36 [288]	10.49 [266]	10.49 [266]	17.32 [440]
F765-150SHP	2.5"	65	11.43 [290]	10.49 [266]	10.49 [266]	17.32 [440]
F780-150SHP	3"	80	11.47 [291]	10.49 [266]	10.49 [266]	18.07 [459]
F7100-150SHP	4"	100	11.58 [294]	10.49 [266]	10.49 [266]	18.80 [478]
F750-300SHP	2"	50	11.36 [288]	10.49 [266]	10.49 [266]	17.32 [440]
F765-300SHP	2.5"	65	11.43 [290]	10.49 [266]	10.49 [266]	17.32 [440]
F780-300SHP	3"	80	11.47 [291]	10.49 [266]	10.49 [266]	18.07 [459]
F7100-300SHP	4"	100	11.58 [294]	10.49 [266]	10.49 [266]	18.80 [478]

Note: Most F7 versions use dual actuators.

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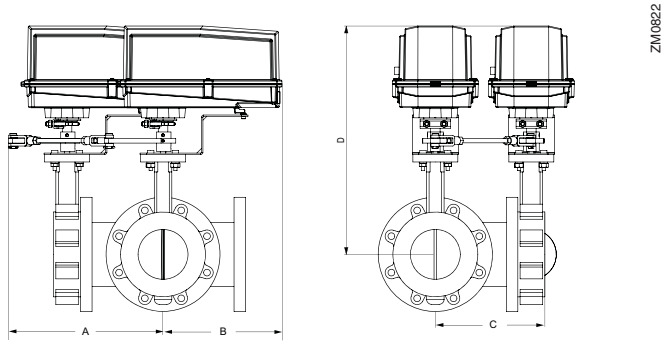
Dimensions with 3-Way Valve



Valve Body	Valve Nominal Size IN	DN [mm]	A	B	C	D	FLG
F750HD/HDU	2"	50	11.26 [286]	10.49 [266]	10.49 [266]	18.94 [481]	F05
F765HD/HDU	2.5"	65	11.32 [287]	10.49 [266]	10.49 [266]	19.49 [495]	F05
F780HD/HDU	3"	80	11.36 [288]	10.49 [266]	10.49 [266]	19.73 [501]	F05
F7100HDU	4"	100	11.58 [294]	10.49 [266]	10.49 [266]	20.47 [520]	F07
F7125HDU	5"	125	11.62 [295]	10.49 [266]	10.49 [266]	20.99 [533]	F07
F7150HDU	6"	150	11.70 [297]	10.49 [266]	10.49 [266]	21.53 [547]	F07

Dimensions (Inches [mm])

Note: Most F7 versions use 2 actuators.

Wiring Diagrams

INSTALLATION NOTES

1 Provide overload protection and disconnect as required.

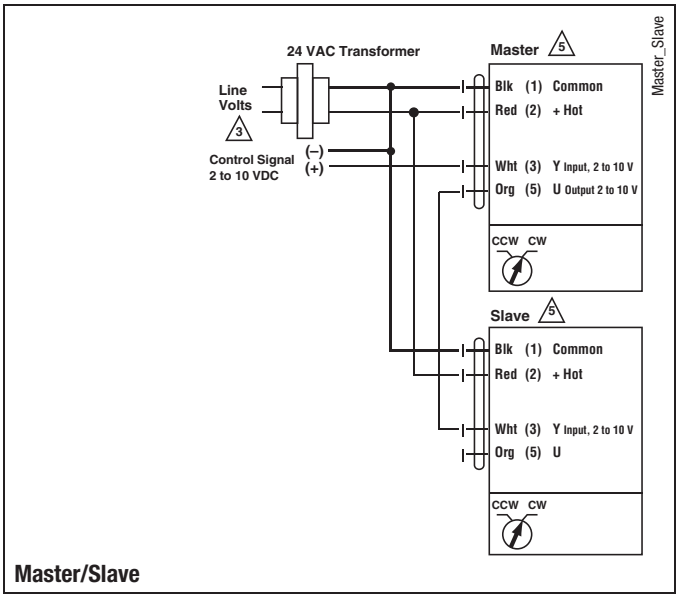
2 ***CAUTION*** *Equipment Damage!*
Actuators may be connected in parallel if not mechanically mounted to the same shaft. Power consumption and input impedance must be observed.

3 Actuators may also be powered by 24 VDC.

4 Position feedback cannot be used with Triac sink controller. The actuator internal common reference is not compatible.

5 Control signal may be pulsed from either the Hot (source) or the Common (sink) 24 VAC line.

8 Contact closures A & B also can be triacs.
A & B should both be closed for triac source and open for triac sink.



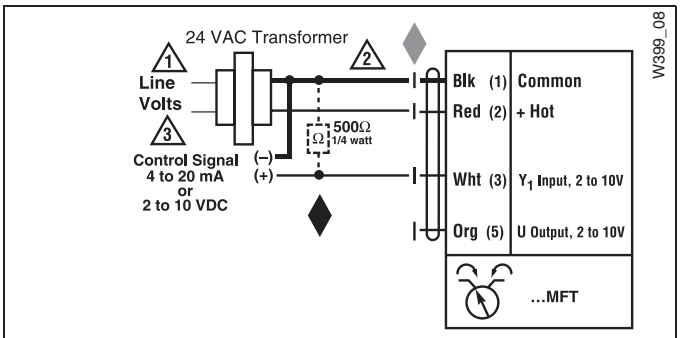
Master/Slave

9 For triac sink the common connection from the actuator must be connected to the hot connection of the controller.

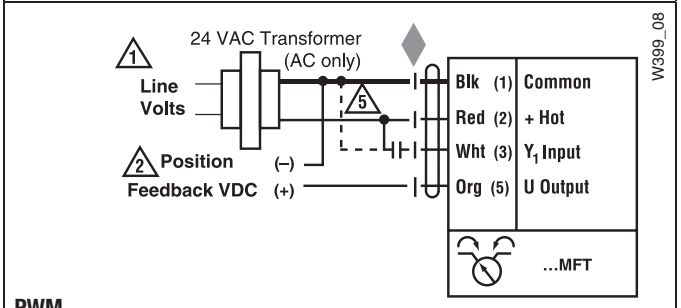
APPLICATION NOTES

The ZG-R01 500 Ω resistor may be used.

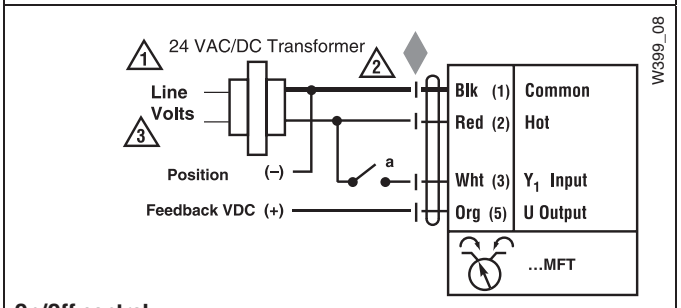
WARNING *Live Electrical Components!*
During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.



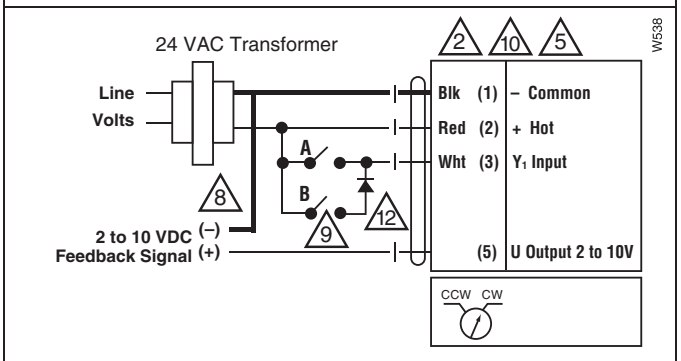
VDC/4-20 mA



PWM



On/Off control



Floating Point control

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